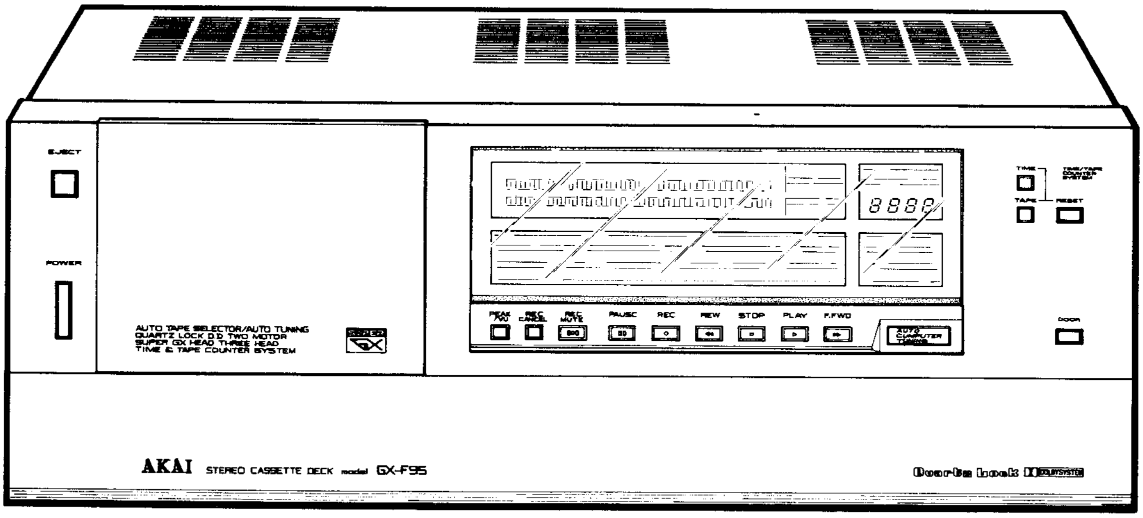
AKAI SERVICE MANUAL


EJECT
POWER
AUTO TAPE SELECTOR/AUTO TUNING
QUARTZ LOCK D.D TWO MOTOR
SUPER GX HEAD THREE HEAD
TIME & TAPE COUNTER SYSTEM
PEAK
REC CANCEL
REC MUTE
PAUSE
REC
REW
STOP
PLAY
F.FWD
AUTO COMPUTER TUNING
TIME
TAPE
RESET
TIME/TAPE COUNTER SYSTEM
DOOR
AKAI STEREO CASSETTE DECK model GX-F95
Quartz Lock

GX-F95

STEREO CASSETTE DECK

MODEL GX-F95

STEREO CASSETTE DECK

MODEL GX-F95

THIS MODEL IS APPLICABLE TO BOTH SILVER AND BLACK PANEL MODELS

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SECTION 1

SERVICE MANUAL

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For basic adjustments, measuring methods, and operating principles, refer to GENERAL TECHNICAL MANUAL.

I. SPECIFICATIONS

TRACK SYSTEM	4 Track 2 Channel Stereo System
TAPE	Phillips Tape Cassette
TAPE SPEED	4.76 cm/s ± 0.2% (1-7/8 ips. ± 0.2%)
HEADS	Erase head x 1 Super GX head for recording x 1 Super GX head for playback x 1
MOTORS	Quartz Locked PLL servo DC motor for capstan drive (Direct drive) x 1 DC motor for reel drive x 1 DC motor for door opening x 1
WOW & FLUTTER	Less than 0.028% WRMS, 0.07% (DIN 45500)
TAPE WINDING TIME	60 sec. using a C-60 cassette tape
FREQUENCY RESPONSE	Normal: 20 to 16,000 Hz ± 3 dB (–20 VU) CrO_2: 20 to 18,000 Hz ± 3 dB (–20 VU) Metal: 20 to 21,000 Hz ± 3 dB (–20 VU)
SIGNAL TO NOISE RATIO	Normal: Better than 60 dB CrO_2: Better than 61 dB Metal: Better than 62 dB (measured via tape with peak recording level) Dolby NR switch ON: Improves up to 10 dB above 5 kHz
HARMONIC DISTORTION	Normal: Less than 0.7% CrO_2: Less than 0.6% Metal: Less than 0.6%
INPUT	MIC: 0.25 mV (input impedance 5.0 kohms) Required microphone impedance: 600 ohms Line: 70 mV (input impedance 47 kohms)
OUTPUT	Line: 410 mV at 0 VU Required load impedance: more than 20 kohms Phone: 100 mV/8 ohms at 0 VU
DIN	Input: 2 mV (input impedance 2 kohms) Output: 410 mV Required load impedance: more than 20 kohms
POWER REQUIREMENTS	100V, 50/60 Hz for Japan 120V, 60 Hz for USA and Canada 220V, 50 Hz for Europe except UK 240V, 50 Hz for UK and Australia 110V/120V/220V/240V, 50/60 Hz switchable for other countries.
POWER CONSUMPTION	JPN 41W CSA, AAL 46W
DIMENSIONS	440(W) x 164(H) x 364(D) mm (17.3 x 6.5 x 14.3")
WEIGHT	12.5 kg (27.5 lbs)

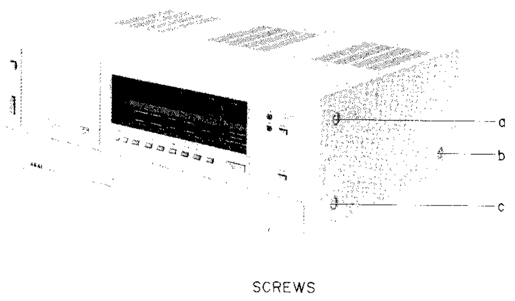
*** For improvement purposes, specifications and design are subject to change without notice.**

*** "Dolby" and the Double D symbol are trademarks of Dolby Laboratories.**
(Manufactured under license from Dolby Laboratories).

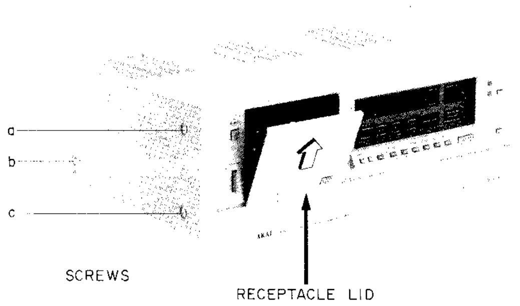
II. DISMANTLING OF UNIT

In case of trouble, etc. necessitating dismantling, please dismantle in the order shown in the photographs. Reassemble in reverse order.

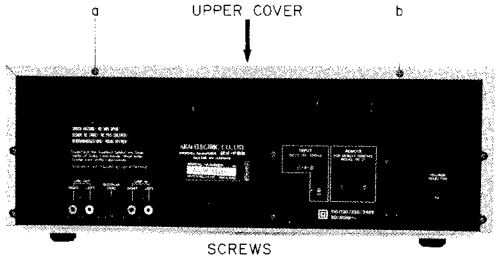
1



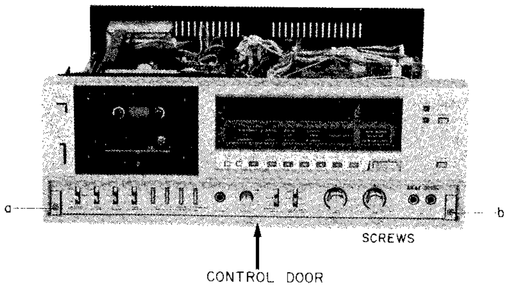
2


a
b
c
SCREWS
RECEPTACLE LID

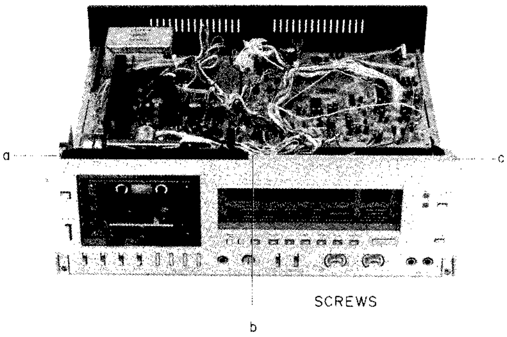
3


a
UPPER COVER
b
SCREWS

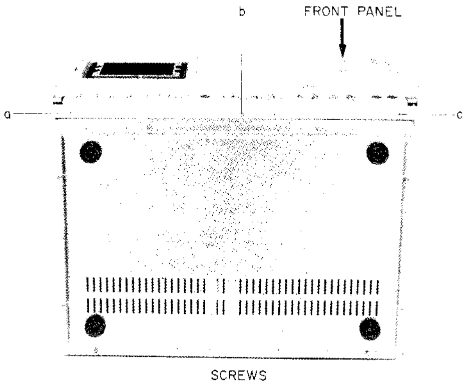
4


a
b
SCREWS
CONTROL DOOR

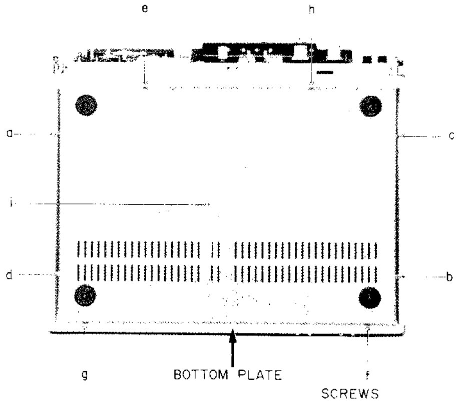
5



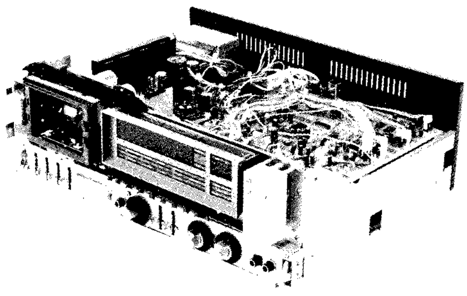
6


b
FRONT PANEL
a
c
SCREWS

7


e
h
a
c
i
d
b
g
BOTTOM PLATE
f
SCREWS

8



III. CONTROLS

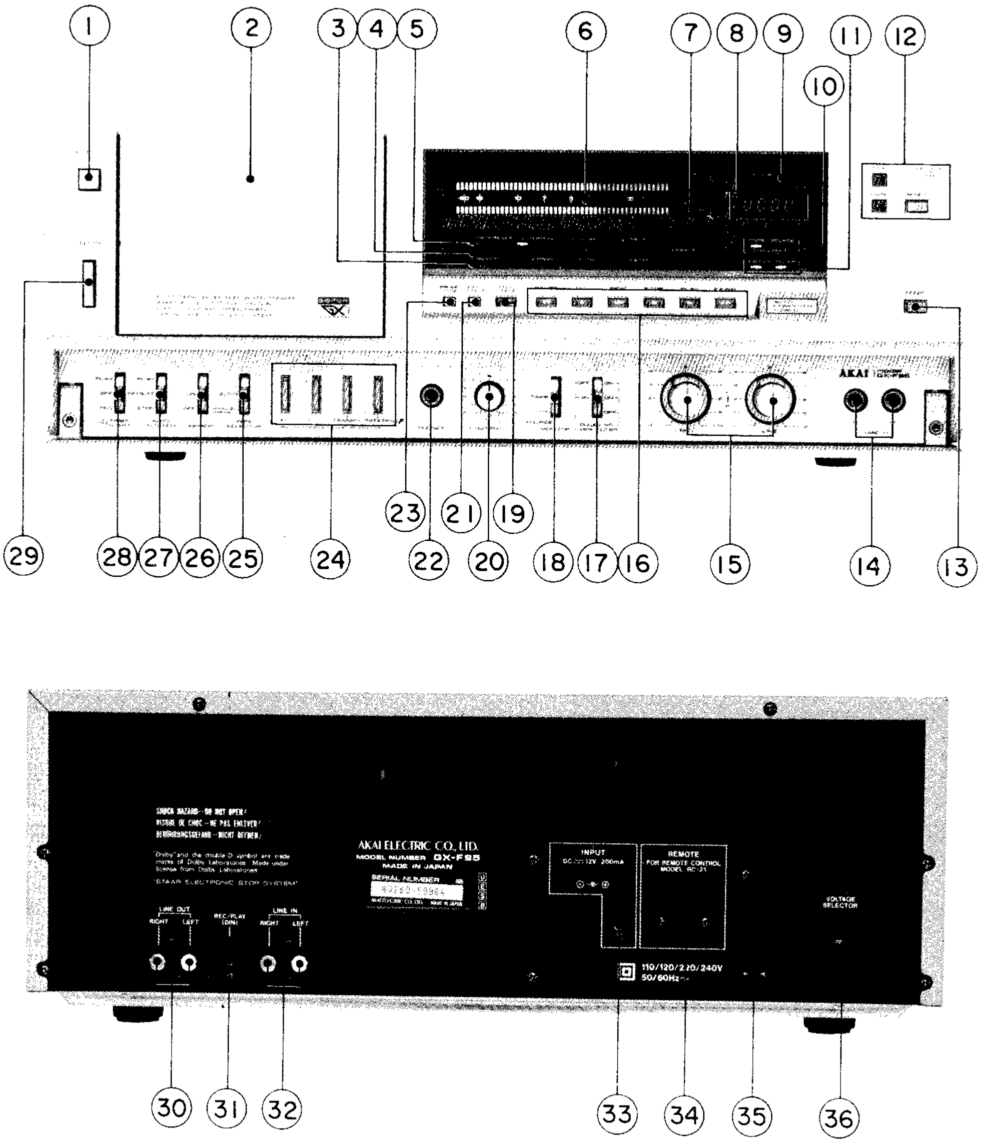
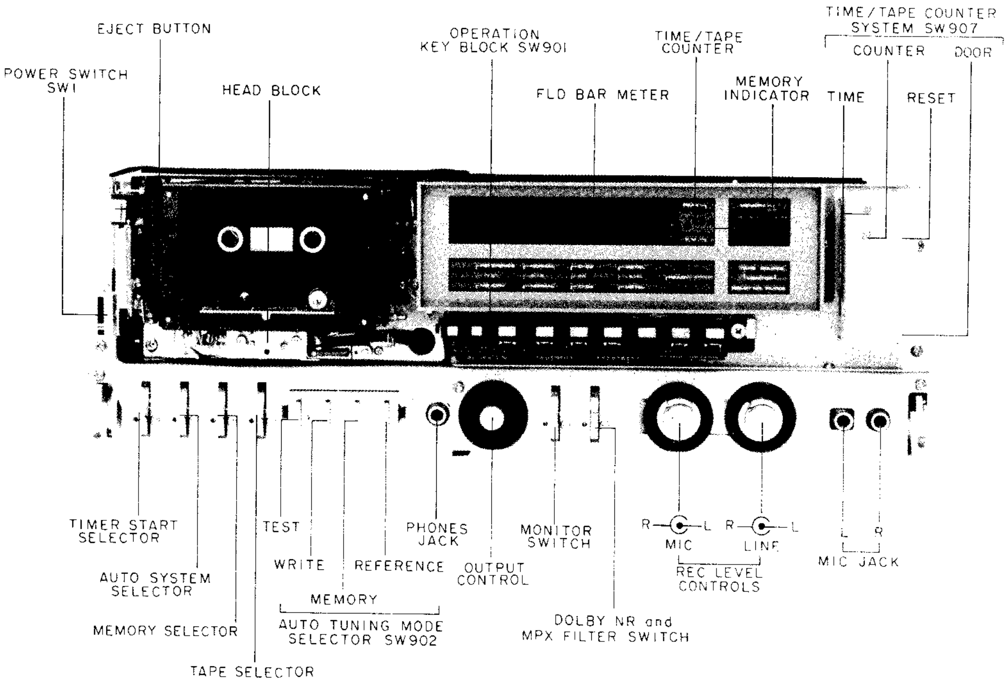


Fig. 1 Controls

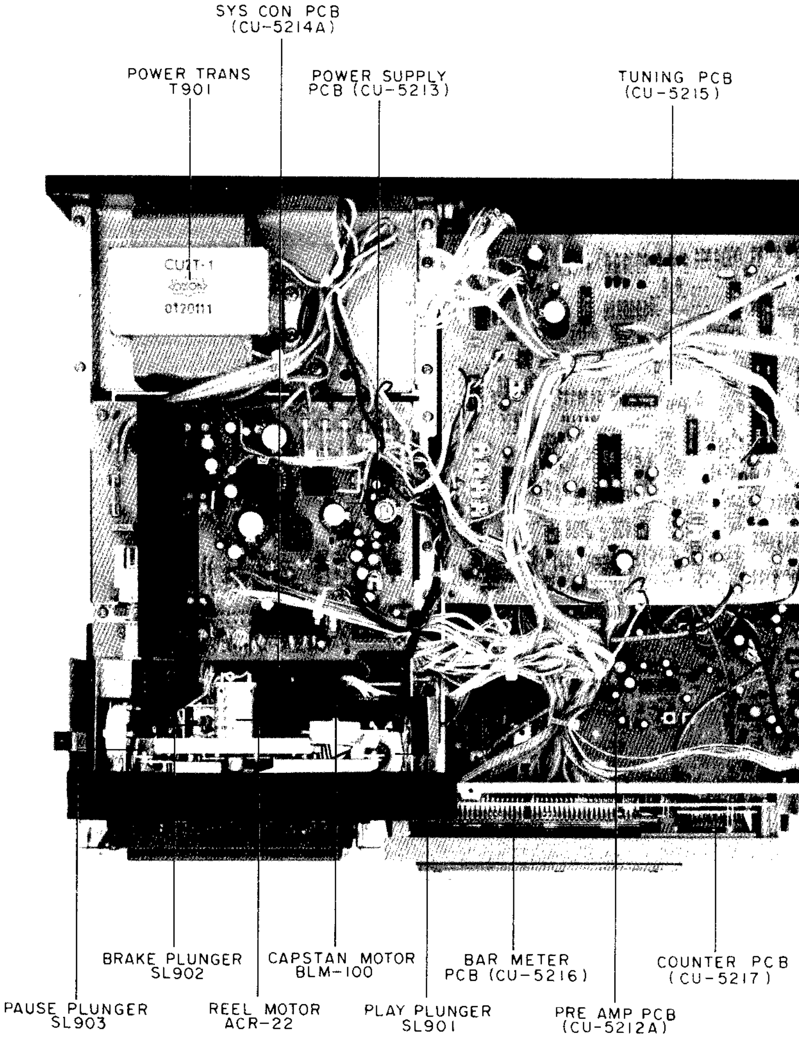
1. EJECT BUTTON
2. CASSETTE RECEPTACLE
   (See through-cassette lid is standard accessory.)
3. MEMORY and TUNING MEMORY INDICATORS
4. AUTO TUNING INDICATORS
5. REFERENCE and REFERENCE TAPE INDICATORS
6. FLD BAR METER WITH MAXIMUM HOLD
7. PEAK and VU INDICATORS
8. TIME/TAPE COUNTER
9. MEMORY INDICATOR
10. TAPE MONITOR INDICATORS
11. DOLBY NR and MPX FILTER INDICATORS
12. TIME/TAPE COUNTER SYSTEM
13. DOOR BUTTON
14. MICROPHONE JACKS (Left-MIC-Right)
15. MICROPHONE (MIC) and LINE RECORDING LEVEL CONTROLS (Left —•)— Right)
16. OPERATING BUTTONS
17. DOLBY NR and MPX FILTER SWITCH
18. TAPE MONITOR SELECTOR
19. RECORDING (REC) MUTE BUTTON (|•|)
20. OUTPUT CONTROL
21. RECORDING (REC) CANCEL BUTTON
22. HEADPHONE JACK (PHONES)
23. PEAK/VU SELECTOR
24. AUTO TUNING MODE SELECTOR
25. TAPE SELECTOR
26. MEMORY SELECTOR
27. AUTO SYSTEM SELECTOR
28. TIMER START SELECTOR
29. POWER SWITCH
30. LINE IN JACKS (RIGHT and LEFT)
31. DIN JACK
    (Some models do not have this facility.)
32. LINE OUT JACKS (RIGHT and LEFT)
33. INPUT JACK
34. REMOTE CONTROL JACK
35. AC INLET
    (Some models are equipped with an AC Cord instead.)
36. VOLTAGE SELECTOR
    (Some models do not have this facility.)

IV. PRINCIPAL PARTS LOCATION



EJECT BUTTON
POWER SWITCH SW1
HEAD BLOCK
OPERATION KEY BLOCK SW901
FLD BAR METER
TIME/TAPE COUNTER
MEMORY INDICATOR
TIME/TAPE COUNTER SYSTEM SW907
TIME
COUNTER
RESET
DOOR
TIMER START SELECTOR
AUTO SYSTEM SELECTOR
MEMORY SELECTOR
TAPE SELECTOR
TEST
WRITE
REFERENCE
MEMORY
AUTO TUNING MODE SELECTOR SW902
PHONES JACK
OUTPUT CONTROL
MONITOR SWITCH
DOLBY NR and MPX FILTER SWITCH
R L
MIC
R L
LINE
REC LEVEL CONTROLS
L R
MIC JACK

Fig. 2 Front View



SYS CON PCB (CU-5214A)
POWER TRANS T901
POWER SUPPLY PCB (CU-5213)
TUNING PCB (CU-5215)
CU2T-1
0120111
BRAKE PLUNGER SL902
CAPSTAN MOTOR BLM-100
BAR METER PCB (CU-5216)
COUNTER PCB (CU-5217)
PAUSE PLUNGER SL903
REEL MOTOR ACR-22
PLAY PLUNGER SL901
PRE AMP PCB (CU-5212A)

Fig. 3 Top View

V. VOLTAGE CONVERSION

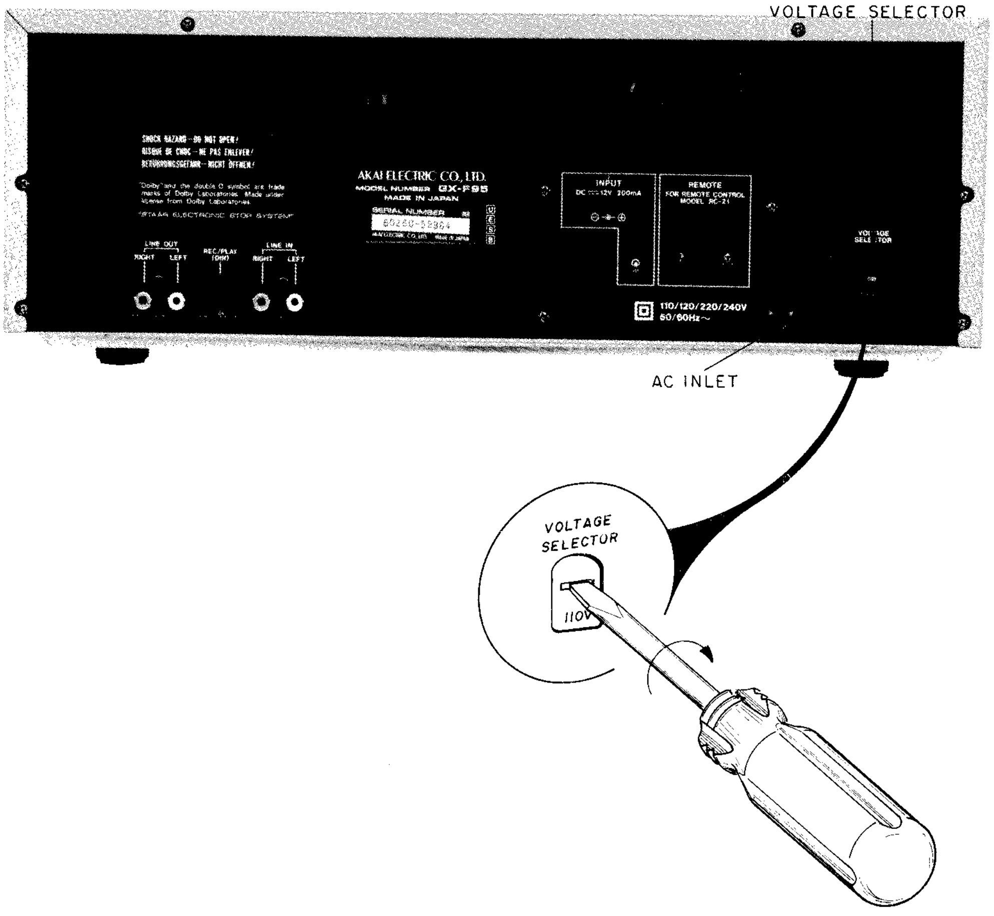

VOLTAGE SELECTOR
AKAI ELECTRIC CO., LTD.
MODEL NUMBER GX-F95
MADE IN JAPAN
LINE OUT
REC/PLAY
LINE IN
INPUT
REMOTE
110/120/220/240V
50/60Hz~
AC INLET
VOLTAGE SELECTOR
110V

Fig. 4 Rear View (U/T, CEE, UK, SAA Models)

1. JPN, CAS, AAL Model

No Voltage conversion.

2. U/T, CEE, UK, SAA Model (Refer to Fig. 4)

Turn the Voltage selector on the rear panel to the right with a minus screwdriver, as shown in Fig. 4, to obtain 110V, 120V, 220V, 240V successively. All you have to do is match the voltage you want with the voltage indicated. Fuse change is not necessary.

CAUTION: When converting voltage turn off the power switch and unplug the power cord.

VI. EXPLANATION OF CIRCUIT ACTIONS

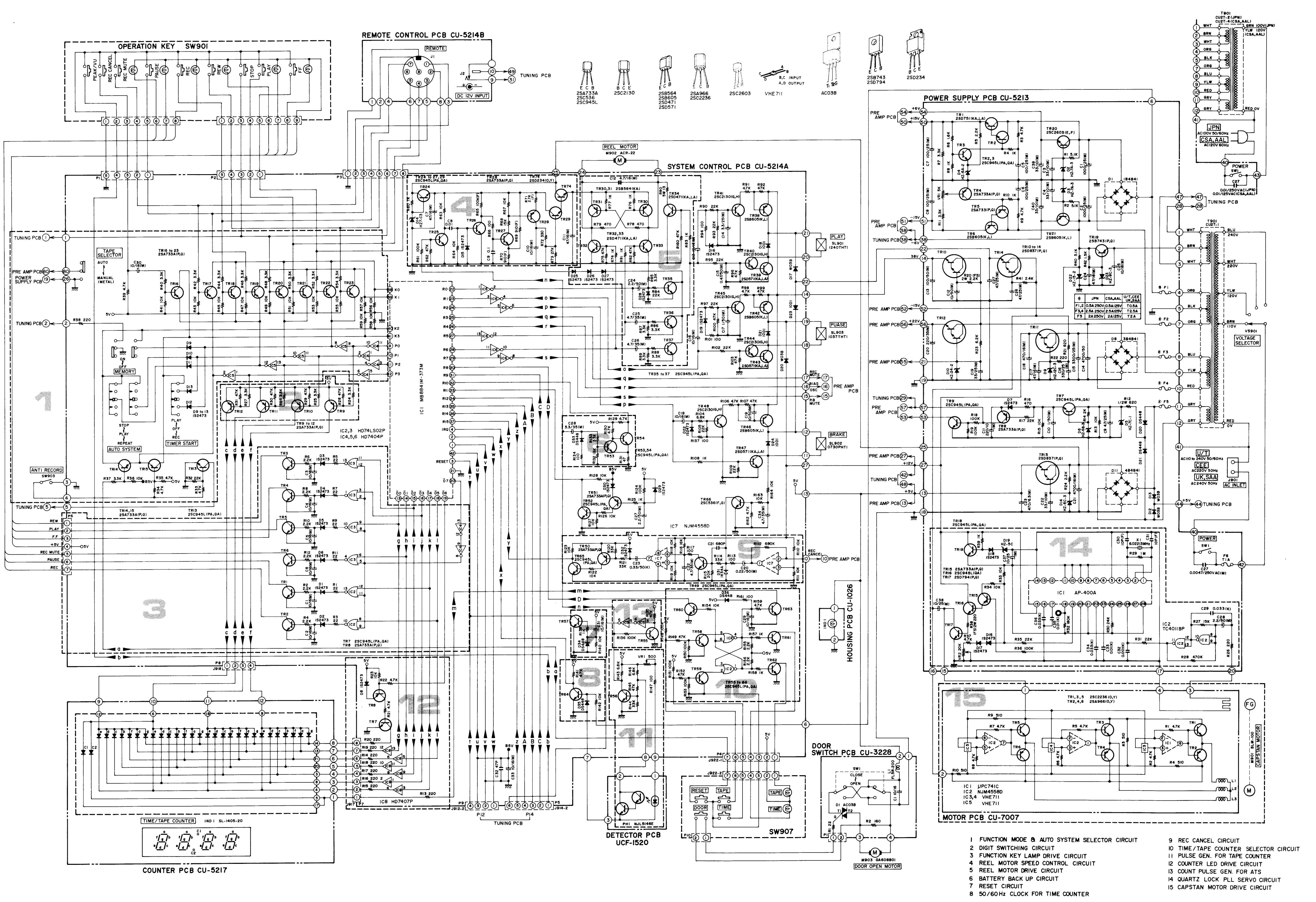
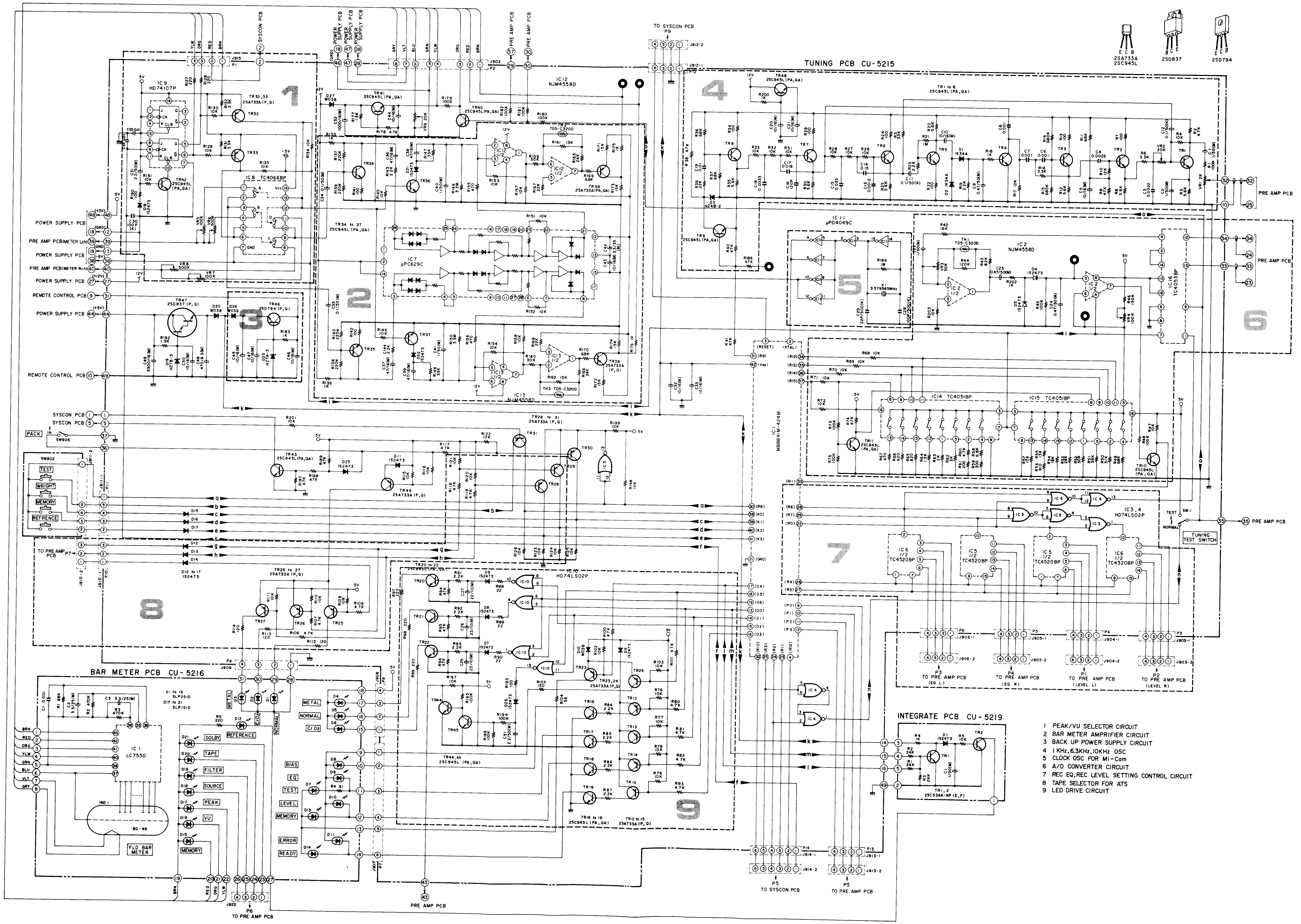
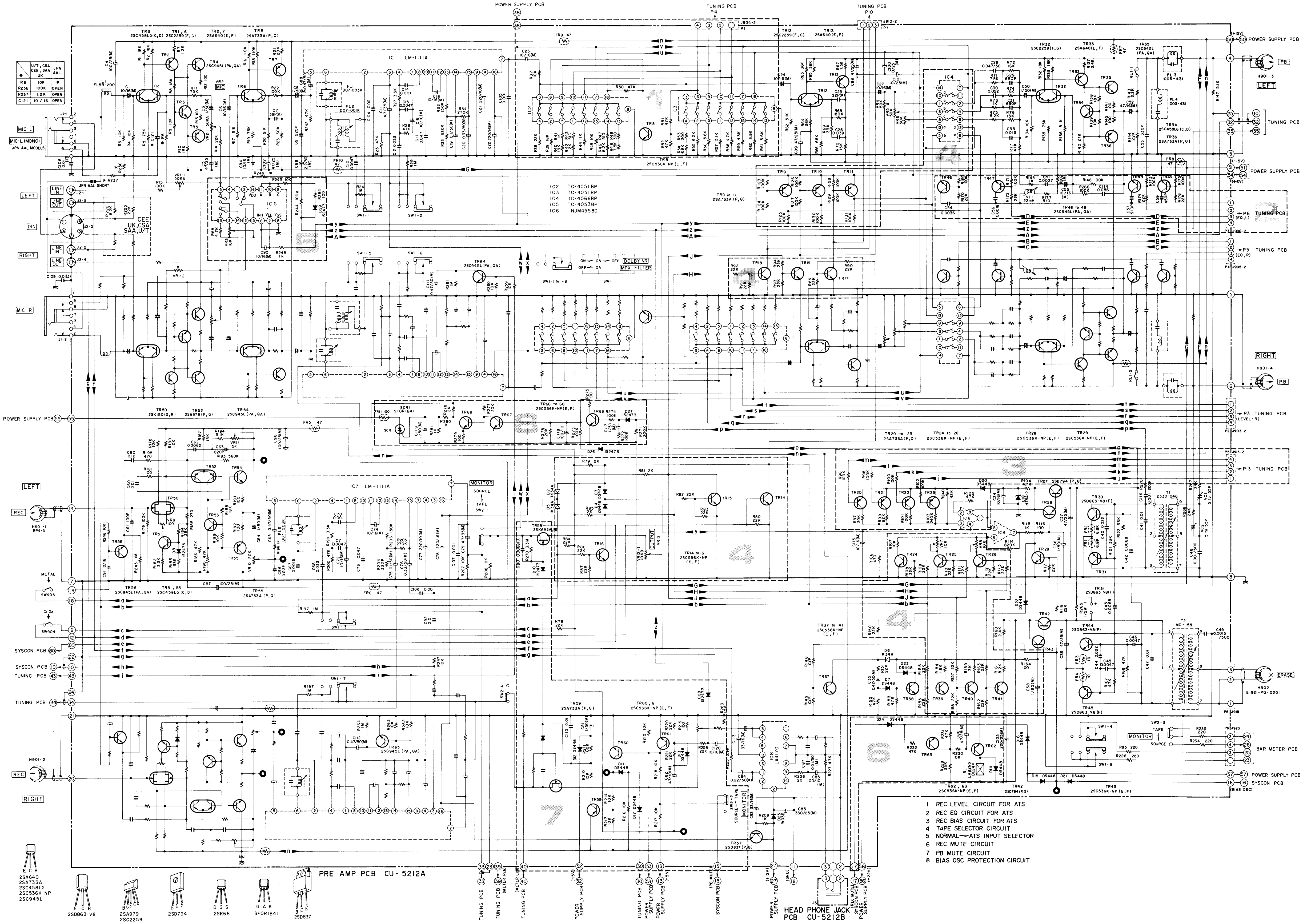

OPERATION KEY SW901
REMOTE CONTROL PCB CU-5214B
DC 12V INPUT
TUNING PCB
POWER SUPPLY PCB CU-5213
SYSTEM CONTROL PCB CU-5214A
REEL MOTOR M902 ACR-22
IC1 MB8841M-373M
IC2,3 HD74LS02P
IC4,5,6 HD7404P
IC7 NJM4558D
IC8 HD7407P
HOUSING PCB CU-1026
DOOR SWITCH PCB CU-3228
DOOR OPEN MOTOR
DETECTOR PCB UCF-1520
SW907
COUNTER PCB CU-5217
TIME/TAPE COUNTER
MOTOR PCB CU-7007
IC1 μPC741C
IC2 NJM4558D
IC3,4 VHE711
IC5 VHE711
IC1 AP-400A
IC2 TC4011BP
CAPSTAN MOTOR
VOLTAGE SELECTOR
1 FUNCTION MODE & AUTO SYSTEM SELECTOR CIRCUIT
2 DIGIT SWITCHING CIRCUIT
3 FUNCTION KEY LAMP DRIVE CIRCUIT
4 REEL MOTOR SPEED CONTROL CIRCUIT
5 REEL MOTOR DRIVE CIRCUIT
6 BATTERY BACK UP CIRCUIT
7 RESET CIRCUIT
8 50/60Hz CLOCK FOR TIME COUNTER
9 REC CANCEL CIRCUIT
10 TIME/TAPE COUNTER SELECTOR CIRCUIT
11 PULSE GEN. FOR TAPE COUNTER
12 COUNTER LED DRIVE CIRCUIT
13 COUNT PULSE GEN. FOR ATS
14 QUARTZ LOCK PLL SERVO CIRCUIT
15 CAPSTAN MOTOR DRIVE CIRCUIT

Fig. 5 Power Supply & Syscon Schematic Diagram


TUNING PCB CU-5215
BAR METER PCB CU-5216
INTEGRATE PCB CU-5219
TO SYSCON PCB
P9
PRE AMP PCB
POWER SUPPLY PCB
REMOTE CONTROL PCB
SYSCON PCB
PACK
SW906
SW902
TEST
WRIGHT
MEMORY
REFRENCE
TO PREAMP PCB
P7
IC9 HD74107P
IC8 TC4066BP
IC12 NJM4558D
IC13 NJM4558D
IC7 μPC629C
IC11 μPD4049C
IC2 NJM4558D
IC16 TC4053BP
IC14 TC4051BP
IC15 TC4051BP
IC1 M58841M-424M
IC3,4 HD74LS02P
IC10 HD74LS02P
IC1 LC7550
IC6 1/2 TC4520BP
IC5 1/2 TC4520BP
TUNING TEST SWITCH
FLD BAR METER
BG-49
2SA733A
2SC945L
2SD837
2SD794
P3 TO PRE AMP PCB (EQ L)
P4 TO PRE AMP PCB (EQ R)
P1 TO PRE AMP PCB (LEVEL L)
P2 TO PRE AMP PCB (LEVEL R)
P5 TO SYSCON PCB
P5 TO PRE AMP PCB
P6 TO PRE AMP PCB
METAL
NORMAL
CrO2
DOLBY
REFERENCE
TAPE
FILTER
SOURCE
PEAK
VU
MEMORY
BIAS
EQ
TEST
LEVEL
ERROR
READY
1
2
3
4
5
6
7
8
9

1 PEAK/VU SELECTOR CIRCUIT
2 BAR METER AMPRIFIER CIRCUIT
3 BACK UP POWER SUPPLY CIRCUIT
4 1 KHz, 6.3KHz, 10KHz OSC
5 CLOCK OSC FOR Mi-Com
6 A/D CONVERTER CIRCUIT
7 REC EQ, REC LEVEL SETTING CONTROL CIRCUIT
8 TAPE SELECTOR FOR ATS
9 LED DRIVE CIRCUIT

Fig. 6 Auto Tuning Schematic Diagram


POWER SUPPLY PCB
TUNING PCB P4
TUNING PCB P10
IC1 LM-1111A
IC2 TC-4051BP
IC3 TC-4051BP
IC4 TC-4066BP
IC5 TC-4053BP
IC6 NJM4558D
IC7 LM-1111A
MIC-L
MIC-L (MONO)
JPN AAL MODELS
JPN AAL SHORT
LEFT
LINE IN
LINE OUT
DIN
RIGHT
CEE UK,CSA SAA,U/T
MIC-R
PB
H901-3
H901-4
TUNING PCB
POWER SUPPLY PCB
P6 TUNING PCB (EQ,L)
P5 TUNING PCB (EQ,R)
P3 TUNING PCB (LEVEL·R)
P13 TUNING PCB
DOLBY NR
MPX FILTER
MONITOR
SOURCE
TAPE
SW2-1
REC
H901-1
METAL
SW905
CrO2
SW904
SYSCON PCB
ERASE
H902
BAR METER PCB
SYSCON PCB
H901-2
PRE AMP PCB CU-5212A
HEAD PHONE JACK PCB CU-5212B
2SA640
2SA733A
2SC458LG
2SC536K-NP
2SC945L
2SD863-V8
2SA979
2SC2259
2SD794
2SK68
SFOR1B41
2SD837
1 REC LEVEL CIRCUIT FOR ATS
2 REC EQ CIRCUIT FOR ATS
3 REC BIAS CIRCUIT FOR ATS
4 TAPE SELECTOR CIRCUIT
5 NORMAL⟷ATS INPUT SELECTOR
6 REC MUTE CIRCUIT
7 PB MUTE CIRCUIT
8 BIAS OSC PROTECTION CIRCUIT

*	U/T, CSA CEE, SAA UK	JPN AAL
R6	10K	1K
R236	100K	OPEN
R237	1.2K	OPEN
C121	10 / 16	OPEN

Fig. 7 Amplifier Schematic Diagram

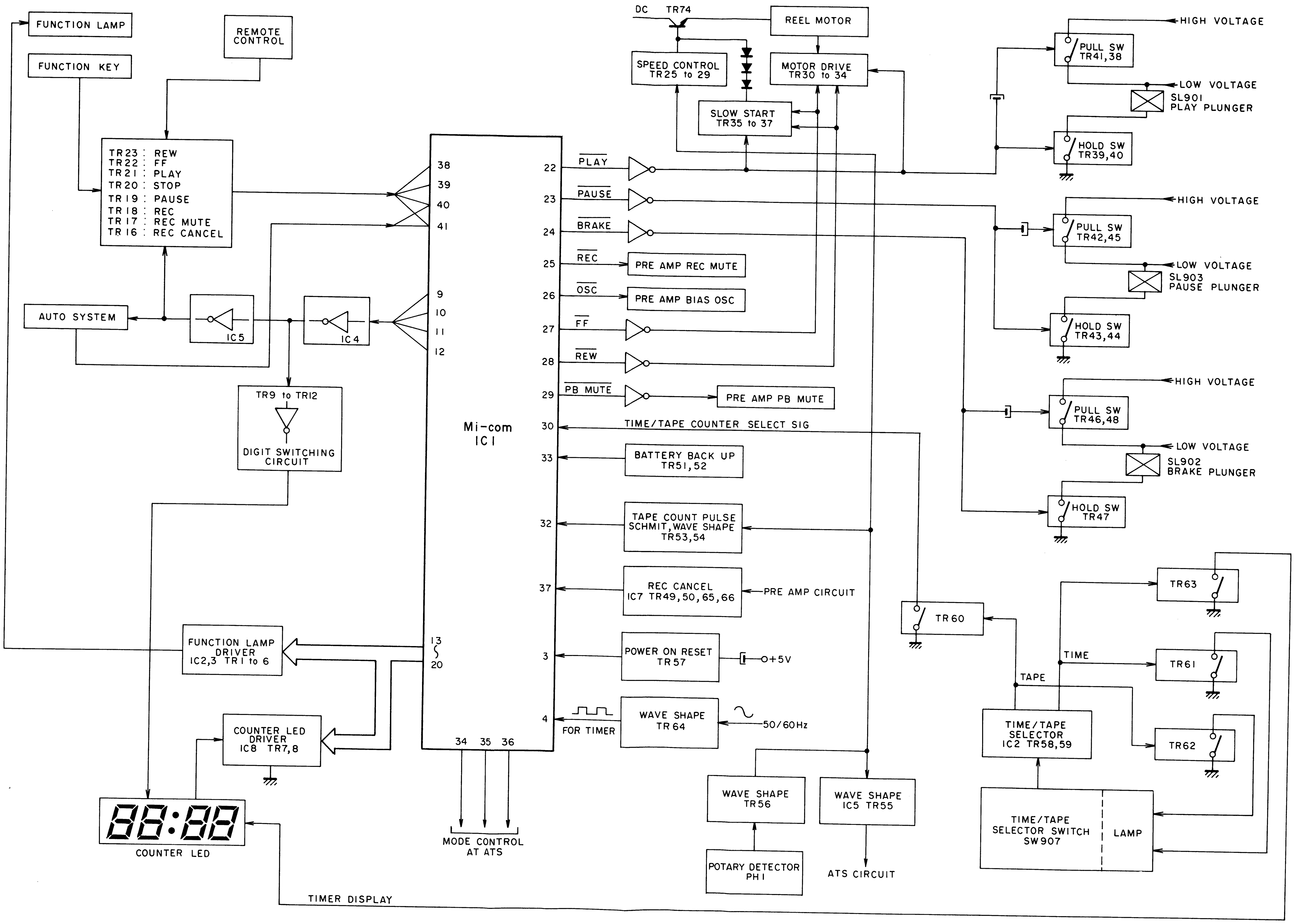

FUNCTION LAMP
FUNCTION KEY
REMOTE CONTROL
TR23 : REW
TR22 : FF
TR21 : PLAY
TR20 : STOP
TR19 : PAUSE
TR18 : REC
TR17 : REC MUTE
TR16 : REC CANCEL
AUTO SYSTEM
IC5
IC4
TR9 to TR12
DIGIT SWITCHING CIRCUIT
FUNCTION LAMP DRIVER IC2,3 TR1 to 6
COUNTER LED DRIVER IC8 TR7,8
COUNTER LED
TIMER DISPLAY
Mi-com IC1
38
39
40
41
9
10
11
12
13
20
34 35 36
MODE CONTROL AT ATS
22
23
24
25
26
27
28
29
30
33
32
37
3
4
PLAY
PAUSE
BRAKE
REC
OSC
FF
REW
PB MUTE
PRE AMP REC MUTE
PRE AMP BIAS OSC
PRE AMP PB MUTE
TIME/TAPE COUNTER SELECT SIG
BATTERY BACK UP TR51,52
TAPE COUNT PULSE SCHMIT,WAVE SHAPE TR53,54
REC CANCEL IC7 TR49,50,65,66
PRE AMP CIRCUIT
POWER ON RESET TR57
+5V
WAVE SHAPE TR64
FOR TIMER
50/60Hz
WAVE SHAPE TR56
POTARY DETECTOR PH1
WAVE SHAPE IC5 TR55
ATS CIRCUIT
DC
TR74
REEL MOTOR
SPEED CONTROL TR25 to 29
MOTOR DRIVE TR30 to 34
SLOW START TR35 to 37
HIGH VOLTAGE
PULL SW TR41,38
LOW VOLTAGE
SL901 PLAY PLUNGER
HOLD SW TR39,40
HIGH VOLTAGE
PULL SW TR42,45
LOW VOLTAGE
SL903 PAUSE PLUNGER
HOLD SW TR43,44
HIGH VOLTAGE
PULL SW TR46,48
LOW VOLTAGE
SL902 BRAKE PLUNGER
HOLD SW TR47
TR60
TR63
TIME
TR61
TAPE
TR62
TIME/TAPE SELECTOR IC2 TR58,59
TIME/TAPE SELECTOR SWITCH SW907
LAMP

Fig. 8 Syscon Block Diagram

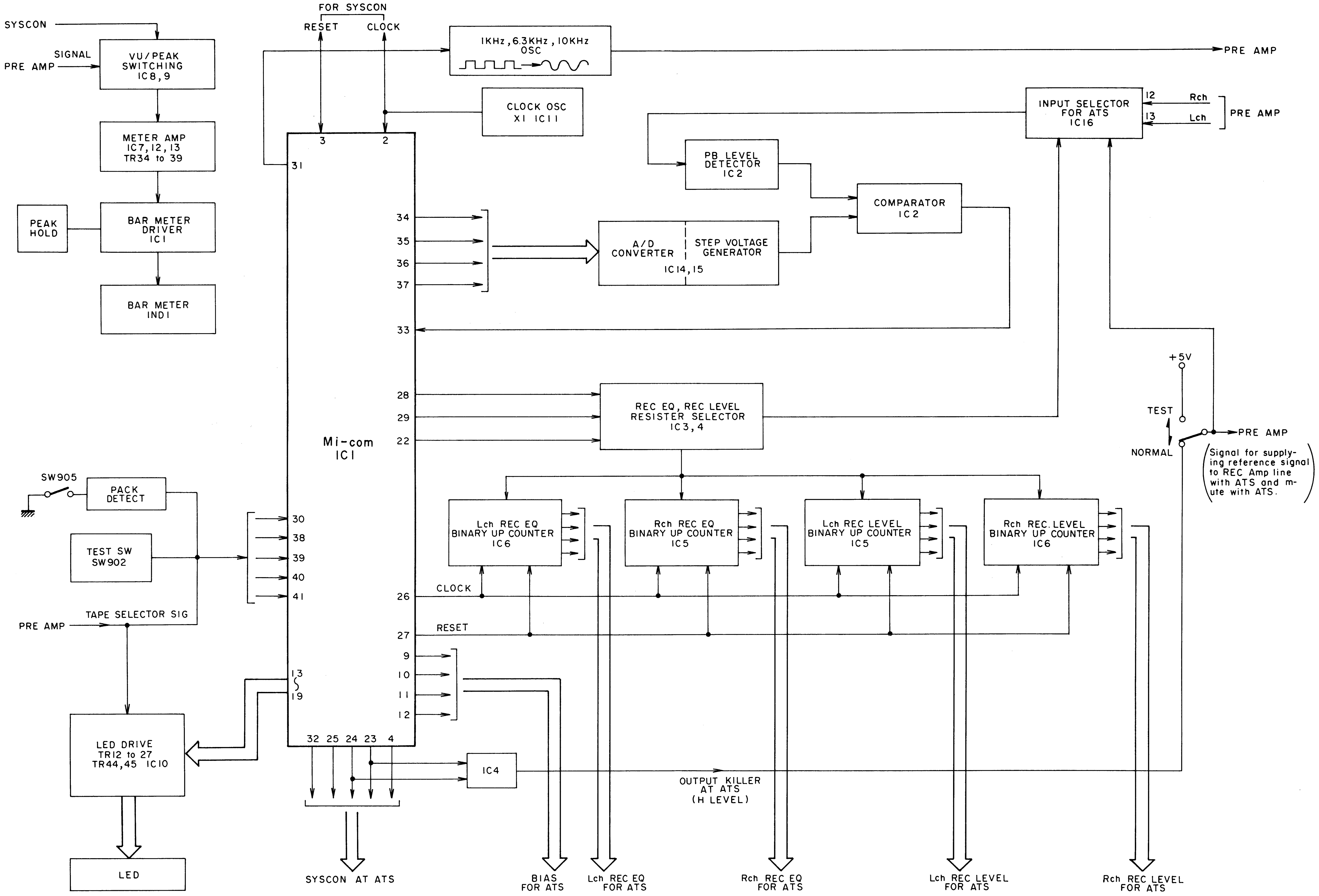

SYSCON
SIGNAL
PRE AMP
VU/PEAK SWITCHING IC8,9
METER AMP IC7,12,13 TR34 to 39
PEAK HOLD
BAR METER DRIVER IC1
BAR METER IND1
FOR SYSCON
RESET
CLOCK
1KHz,6.3KHz,10KHz OSC
PRE AMP
CLOCK OSC X1 IC11
INPUT SELECTOR FOR ATS IC16
12
13
Rch
Lch
PRE AMP
PB LEVEL DETECTOR IC2
COMPARATOR IC2
A/D CONVERTER
STEP VOLTAGE GENERATOR
IC14,15
3
2
31
34
35
36
37
33
28
29
22
Mi-com IC1
REC EQ, REC LEVEL RESISTER SELECTOR IC3,4
+5V
TEST
NORMAL
PRE AMP
Signal for supplying reference signal to REC Amp line with ATS and mute with ATS.
SW905
PACK DETECT
TEST SW SW902
30
38
39
40
41
Lch REC EQ BINARY UP COUNTER IC6
Rch REC EQ BINARY UP COUNTER IC5
Lch REC LEVEL BINARY UP COUNTER IC5
Rch REC. LEVEL BINARY UP COUNTER IC6
CLOCK
26
RESET
27
PRE AMP
TAPE SELECTOR SIG
9
10
11
12
13
19
32 25 24 23 4
LED DRIVE TR12 to 27 TR44,45 IC10
IC4
OUTPUT KILLER AT ATS (H LEVEL)
LED
SYSCON AT ATS
BIAS FOR ATS
Lch REC EQ FOR ATS
Rch REC EQ FOR ATS
Lch REC LEVEL FOR ATS
Rch REC LEVEL FOR ATS

Fig. 9 Auto Tuning System Block Diagram

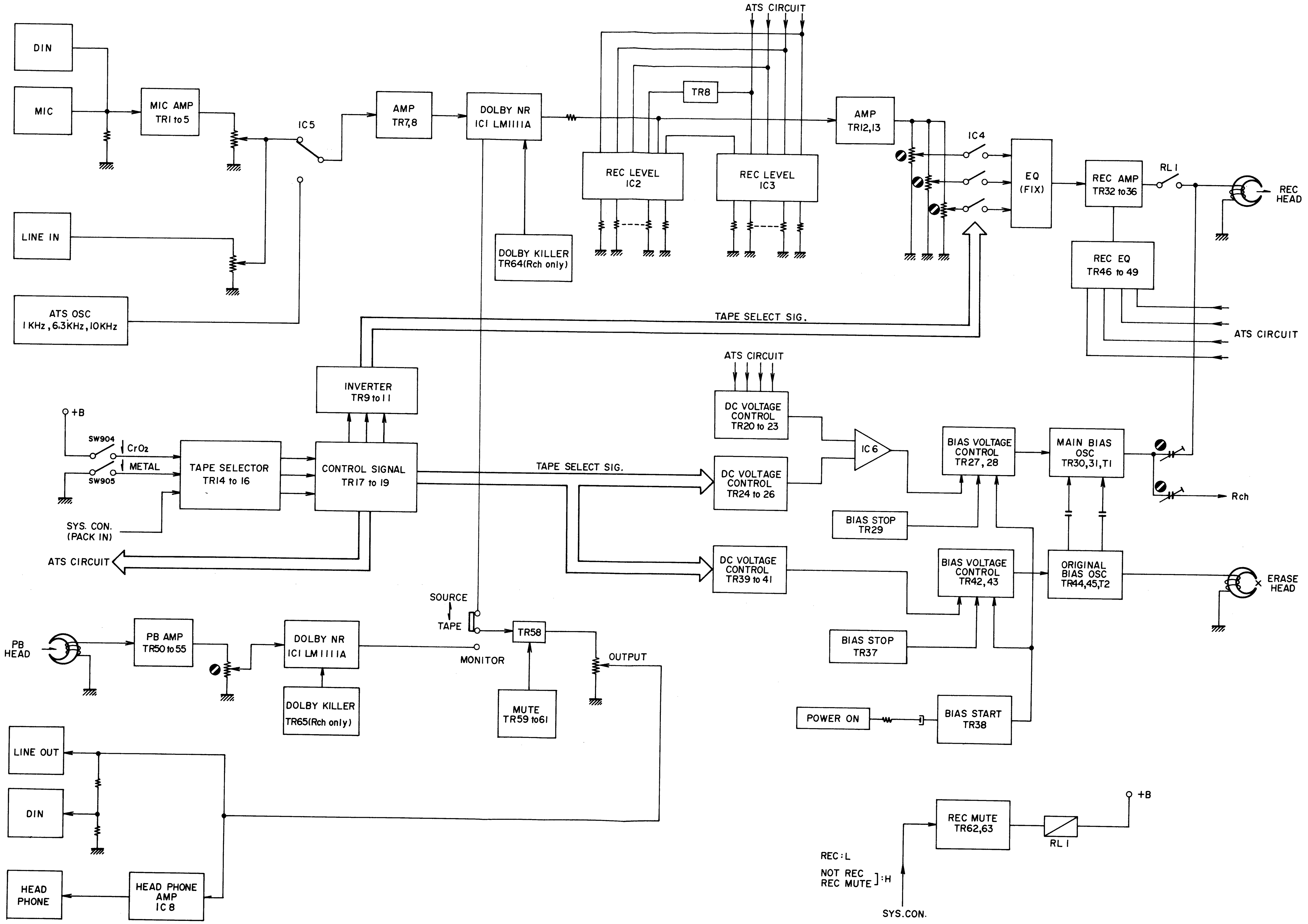

DIN
MIC
MIC AMP TR1 to 5
IC5
AMP TR7,8
DOLBY NR IC1 LM1111A
ATS CIRCUIT
TR8
AMP TR12,13
IC4
REC LEVEL IC2
REC LEVEL IC3
EQ (FIX)
REC AMP TR32 to 36
RL1
REC HEAD
LINE IN
DOLBY KILLER TR64(Rch only)
REC EQ TR46 to 49
ATS OSC 1KHz, 6.3KHz, 10KHz
TAPE SELECT SIG.
ATS CIRCUIT
ATS CIRCUIT
INVERTER TR9 to 11
DC VOLTAGE CONTROL TR20 to 23
+B
SW904
CrO2
METAL
SW905
TAPE SELECTOR TR14 to 16
CONTROL SIGNAL TR17 to 19
TAPE SELECT SIG.
IC6
DC VOLTAGE CONTROL TR24 to 26
BIAS VOLTAGE CONTROL TR27, 28
MAIN BIAS OSC TR30,31,T1
Rch
SYS. CON. (PACK IN)
BIAS STOP TR29
ATS CIRCUIT
DC VOLTAGE CONTROL TR39 to 41
BIAS VOLTAGE CONTROL TR42, 43
ORIGINAL BIAS OSC TR44,45,T2
ERASE HEAD
SOURCE
TAPE
TR58
PB HEAD
PB AMP TR50 to 55
DOLBY NR IC1 LM1111A
MONITOR
OUTPUT
BIAS STOP TR37
DOLBY KILLER TR65(Rch only)
MUTE TR59 to 61
POWER ON
BIAS START TR38
LINE OUT
DIN
+B
REC MUTE TR62,63
RL1
REC : L
NOT REC
REC MUTE] : H
SYS.CON.
HEAD PHONE
HEAD PHONE AMP IC8

Fig. 10 Amplifier Block Diagram

1. INTRODUCTION

The GX-F95 is a 3-head type cassette deck with many excellent features. Being one of the most sophisticated machine, the GX-F95 is the result of newly developed technology coupled with many years of experience and know-how with many models that precede the GX-F95.

With this in mind, this document is intended to provide technical explanations in the form of supplements through comparison with the conventional models (often with the GX-F90).

The GX-F95 basically differs from the conventional machines (e.g., GX-F90) in that:

1) it incorporates the microcomputer-based ATS (Auto Tuning System) circuit which permits setting of the optimum bias, Rec EQ and Rec level in accordance with the characteristics of tape in use.
2) it also has a microcomputer incorporated in the system control circuit to provide control over the timing of operation.
3) it employs a capstan motor that is driven directly by the quartz-lock PLL servo circuit.
4) it incorporates direct coupled (DC) over the recording amplifier.

2. SYSTEM DESCRIPTION

1) ATS (Auto Tuning System) Circuit

ATS permits automatic identifcation of tape type by the use of a built-in microcomputer and determines the optimum bias, Rec EQ and Rec level for that particular type of tape in use.

Types of cassette tape currently available on the market include metal tape, CrO_2 tape, LH tape and LN tape: the types of tapes available will be innumerable if the fact that tape characteristics often differ from one tape manufacturer to another is taken into account.

To cope with this situation, ATS provides a means of making full use of the characteristics of a specific type of tape and thereby ensuring recording and playback under optimum conditions.

ATS has a microcomputer which instantly analyzes the characteristics of individual tapes and informs the tape deck of the optimum bias, Rec EQ and Rec level.

The ATS incorporated in the GX-F95 is specifically designed to provide for separate right-left double tuning in which EQ and Rec levels are tuned twice for each of the right and left channels (the bias is tuned twice for both the right and left channels at the same time).

It also has a mechanism that permits automatic fast-forwarding of the starting portion of the tape where the tape characteristic tends to fluctuate at the time of tuning. Fig. 11 shows the flow chart for the ATS.

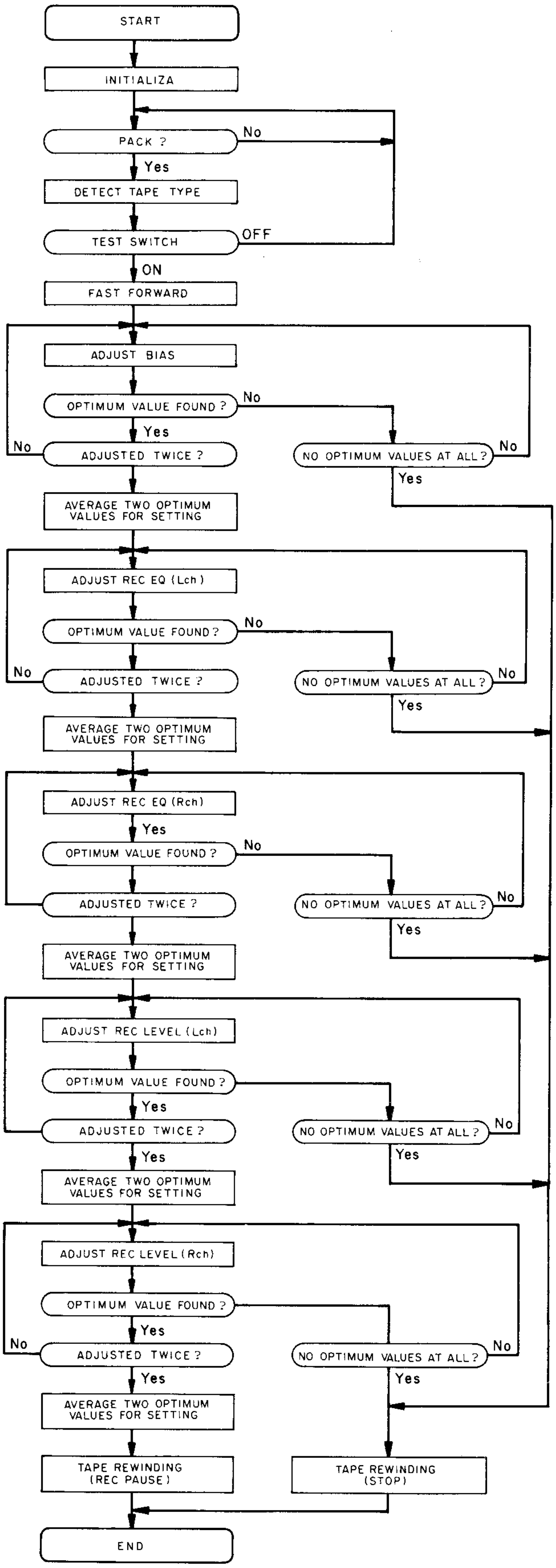

START
INITIALIZA
PACK ?
No
Yes
DETECT TAPE TYPE
TEST SWITCH
OFF
ON
FAST FORWARD
ADJUST BIAS
OPTIMUM VALUE FOUND ?
No
Yes
ADJUSTED TWICE ?
No
NO OPTIMUM VALUES AT ALL ?
No
Yes
AVERAGE TWO OPTIMUM VALUES FOR SETTING
ADJUST REC EQ (Lch)
OPTIMUM VALUE FOUND ?
No
ADJUSTED TWICE ?
No
NO OPTIMUM VALUES AT ALL ?
No
Yes
AVERAGE TWO OPTIMUM VALUES FOR SETTING
ADJUST REC EQ (Rch)
Yes
OPTIMUM VALUE FOUND ?
No
ADJUSTED TWICE ?
NO OPTIMUM VALUES AT ALL ?
No
Yes
AVERAGE TWO OPTIMUM VALUES FOR SETTING
ADJUST REC LEVEL (Lch)
OPTIMUM VALUE FOUND ?
Yes
ADJUSTED TWICE ?
Yes
NO OPTIMUM VALUES AT ALL ?
No
Yes
AVERAGE TWO OPTIMUM VALUES FOR SETTING
ADJUST REC LEVEL (Rch)
OPTIMUM VALUE FOUND ?
Yes
ADJUSTED TWICE ?
No
Yes
NO OPTIMUM VALUES AT ALL ?
No
Yes
AVERAGE TWO OPTIMUM VALUES FOR SETTING
TAPE REWINDING (REC PAUSE)
TAPE REWINDING (STOP)
END

Fig. 11 Auto Tuning Flow Chart

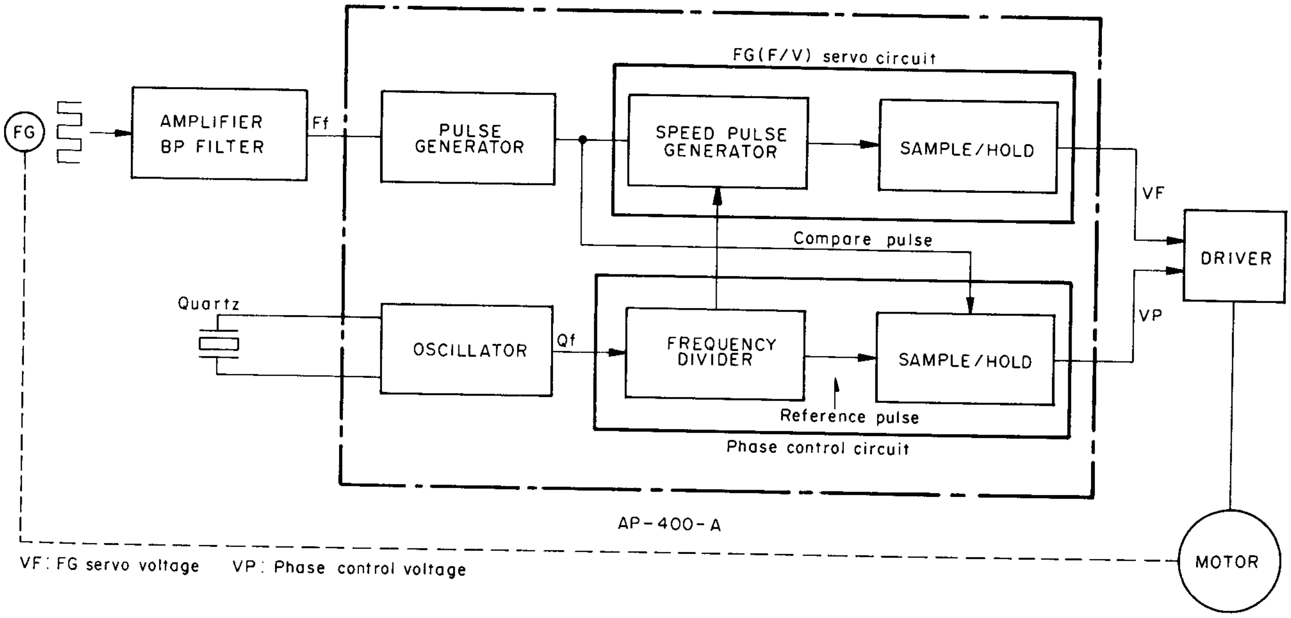

FG
AMPLIFIER
BP FILTER
Ff
PULSE GENERATOR
FG(F/V) servo circuit
SPEED PULSE GENERATOR
SAMPLE/HOLD
VF
Compare pulse
DRIVER
Quartz
OSCILLATOR
Qf
FREQUENCY DIVIDER
SAMPLE/HOLD
VP
Reference pulse
Phase control circuit
AP-400-A
MOTOR
VF: FG servo voltage
VP: Phase control voltage

Fig. 12 Block Diagram of Quartz Lock PLL Servo Circuit

2) Timing of Operation

Various improvements in performance can be achieved by the use of a microcomputer to control the operational timing of each function. For example, a noise problem often encountered upon "rise" can be solved by controlling the timing of record/playback operation with a microcomputer. In addition, use of a microcomputer can virtually eliminate the possibility of degradation in performance due to wear since most of the mechanical switching mechanisms required formerly are no longer necessary with microcomputers.

3) Quartz-Lock D.D System

With the GX-F95, to ensure high rotational accuracy, phase control is effected through quartz oscillation (known as quartz lock).

Coupled with the high-performance direct drive mechanism employed on the GX-F90, this quartz lock system helps to maintain extremely high rotational accuracy from the start to the end of tape winding.

See the Model GX-F90 and AP-Q50 Manuals for the operatin principle of the motor and the action of the quartz-lock servo circuit.

4) Direct Coupled (DC) Recording Amplifier

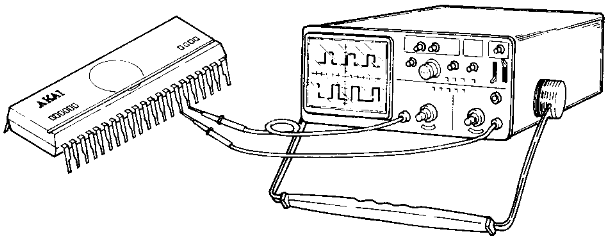
To enhance the quality of sound, it is necessary to employ high-performance amplifiers. The recording amplifier incorporated in the GX-F95 features direct coupled (DC) to minimize distortion at recording time.

For the playback amplifier, dual FET is adopted, and other improvements are also incorporated in amplifier circuitry.

3. OUTPUT, VOLTAGE AND WAVEFORM ASSOCIATED WITH PINS OF MICROCOMPUTERS

Outputs of a microcomputer can be either "1(H)" or "0(L)" in a given mode as with conventional digital ICs, or they can be produced based on timing between two or more pulse waveforms. They even may vary depending on the type of tape in use. Thus, it is generally necessary to conduct waveform check with the use of an oscilloscope, etc.

With the microcomputer employed for ATS, the state of 4-bit signals (e.g., 0011) for each of bias, level and EQ outputs varies depending on the type of tape in use. For this reason, circuit diagrams in this manual give only typical outputs as reference outputs.



4. DIFFERENCES FROM CONVENTIONAL MODELS

The Differences brought about by the adoption of ATS are illustrated in comparison with a conventional model (GX-F90) in the following block diagrams:

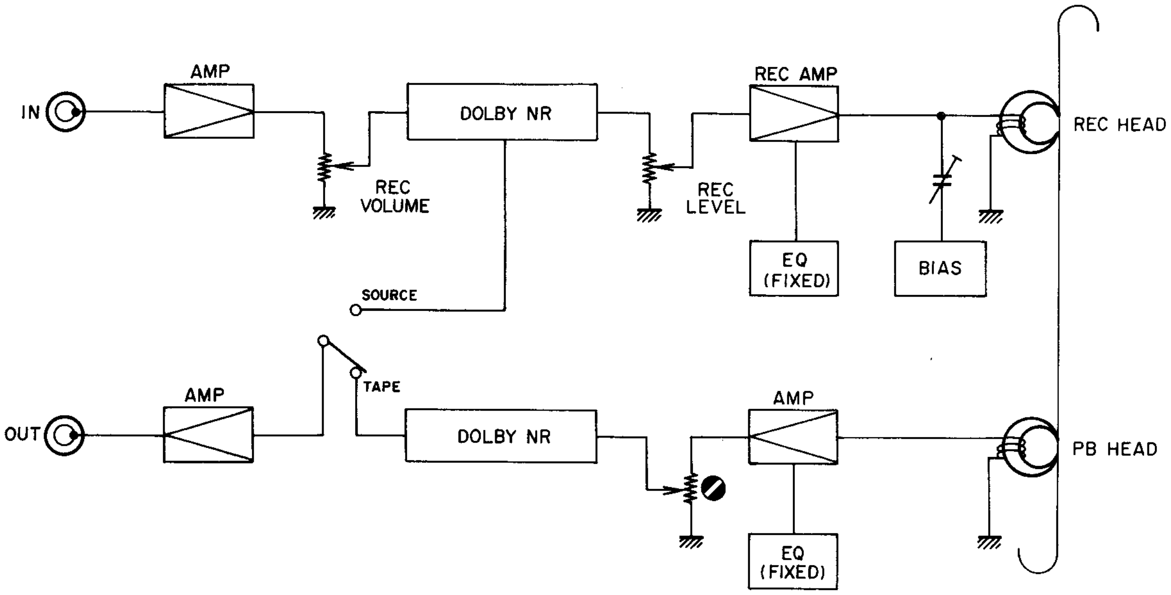
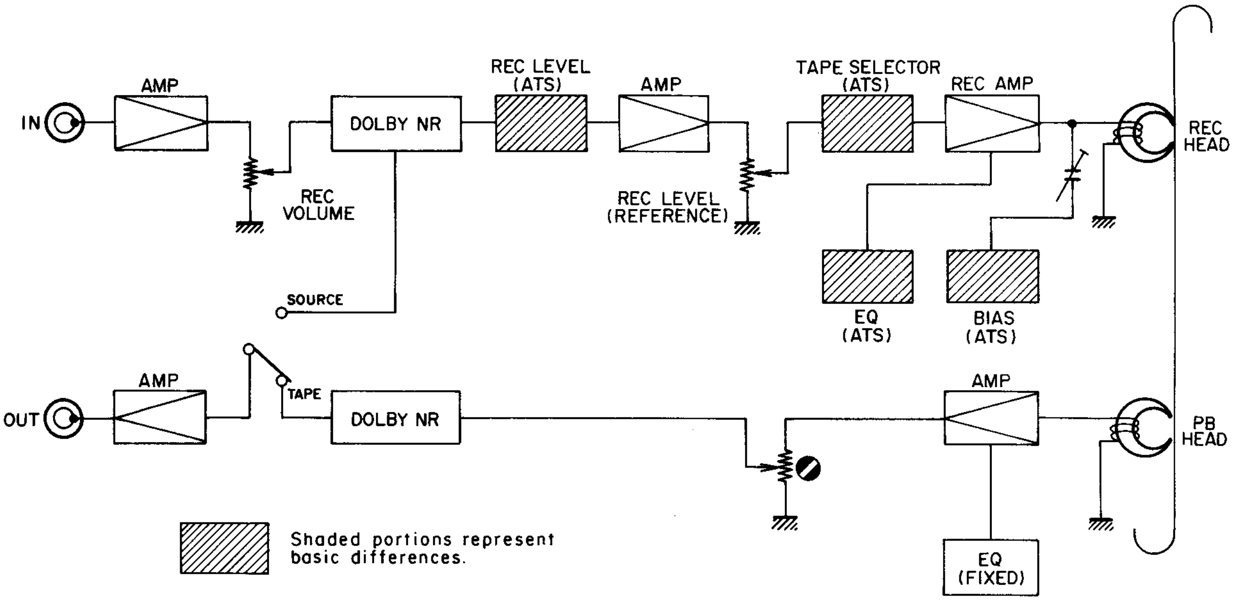

IN
AMP
DOLBY NR
REC VOLUME
REC AMP
REC LEVEL
EQ (FIXED)
BIAS
REC HEAD
SOURCE
TAPE
OUT
AMP
DOLBY NR
AMP
EQ (FIXED)
PB HEAD

Fig. 13 GX-F90 Amp Block Diagram


IN
AMP
DOLBY NR
REC LEVEL (ATS)
AMP
TAPE SELECTOR (ATS)
REC AMP
REC HEAD
REC VOLUME
REC LEVEL (REFERENCE)
EQ (ATS)
BIAS (ATS)
SOURCE
TAPE
OUT
AMP
DOLBY NR
AMP
PB HEAD
EQ (FIXED)

▨ Shaded portions represent basic differences.

Fig. 14 GX-F95 Amp Block Diagram

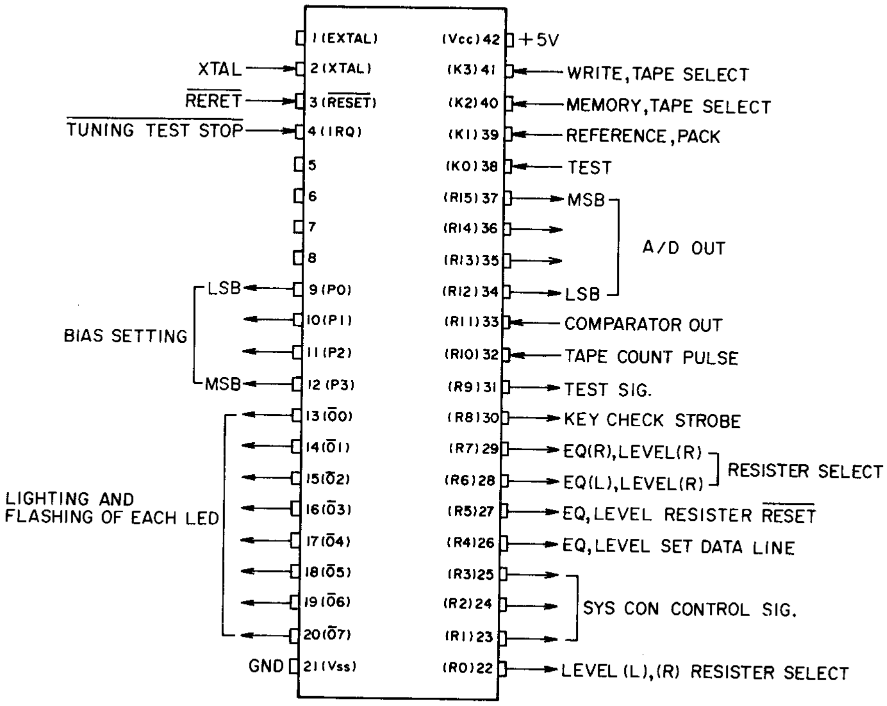

1 (EXTAL)
XTAL
2 (XTAL)
RERET
3 (RESET)
TUNING TEST STOP
4 (IRQ)
5
6
7
8
LSB
9 (P0)
BIAS SETTING
10 (P1)
11 (P2)
MSB
12 (P3)
13 (O0)
14 (O1)
15 (O2)
LIGHTING AND FLASHING OF EACH LED
16 (O3)
17 (O4)
18 (O5)
19 (O6)
20 (O7)
GND
21 (Vss)
(Vcc) 42
+5V
(K3) 41
WRITE, TAPE SELECT
(K2) 40
MEMORY, TAPE SELECT
(K1) 39
REFERENCE, PACK
(K0) 38
TEST
(R15) 37
MSB
(R14) 36
(R13) 35
A/D OUT
(R12) 34
LSB
(R11) 33
COMPARATOR OUT
(R10) 32
TAPE COUNT PULSE
(R9) 31
TEST SIG.
(R8) 30
KEY CHECK STROBE
(R7) 29
EQ(R), LEVEL(R)
RESISTER SELECT
(R6) 28
EQ(L), LEVEL(R)
(R5) 27
EQ, LEVEL RESISTER RESET
(R4) 26
EQ, LEVEL SET DATA LINE
(R3) 25
(R2) 24
SYS CON CONTROL SIG.
(R1) 23
(R0) 22
LEVEL (L), (R) RESISTER SELECT

Fig. 15 Terminal Description of ATS Microcomputer

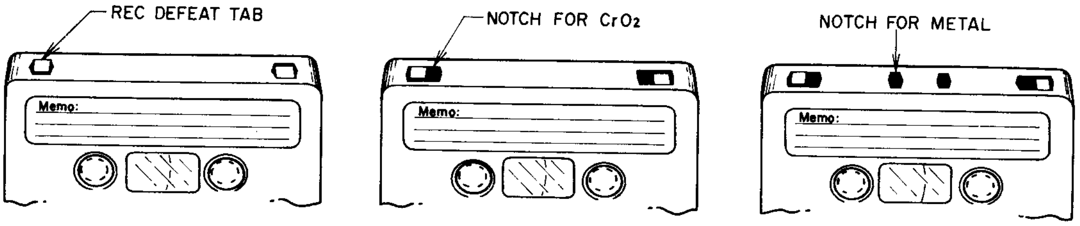

REC DEFEAT TAB
Memo:
NOTCH FOR CrO₂
Memo:
NOTCH FOR METAL
Memo:

Fig. 16 Cassette Configurations

5. EXPLANATION OF ATS ACTION

With ATS, depressing the TEST button on the auto tuning mode selector causes the deck itself to establish the optimum amount of bias, Rec EQ and Rec level automatically. In other words, the vary procedure required to adjust the bias, Rec EQ and Rec level manually with the use of a measuring instrument is carried out within the deck according to the program contained in the microcomputer. The ATS operates in the sequence of:

1) Identifying the type of tape (This step is included here for clarity though it does not involve a setting operation as given below.)
2) Setting the Bias
3) Setting the Rec EQ
4) Setting the Rec level

(Setting is automatic through depression of the TEST button.)

What has been mentioned above will be discussed in detail in the rest of this section. Fig. 15 shows terminal connections on the microcomputer for ATS (MB8841M-424M).

1) Identifying tape types

Upon insertion of a cassette pack, Normal/CrO$_2$/Metal identification is made automatically according to the type of cassette in use.

This identification method is, like the one employed to prevent recording, based on the presence/absence of a detection notch as illustrated in Fig. 16. However, some types of metal tape packs lack the detection notch (due partly to their relatively recent introduction into the market) and they require manual setting of the tape selector.

Upon detection of the type of tape in use, the erasing OSC, bias, Rec level, PB EQ and Rec EQ are set in "reference" for each tape type by the internal logic circuitry. Also, signals are sent to LED to display LN, CrO$_2$ or Metal. Note that at the factory, the bias, EQ and Rec level are adjusted using the appropriate reference tape without operating the ATS.

5-1. Setting the Bias, Rec EQ and Rec Level with ATS

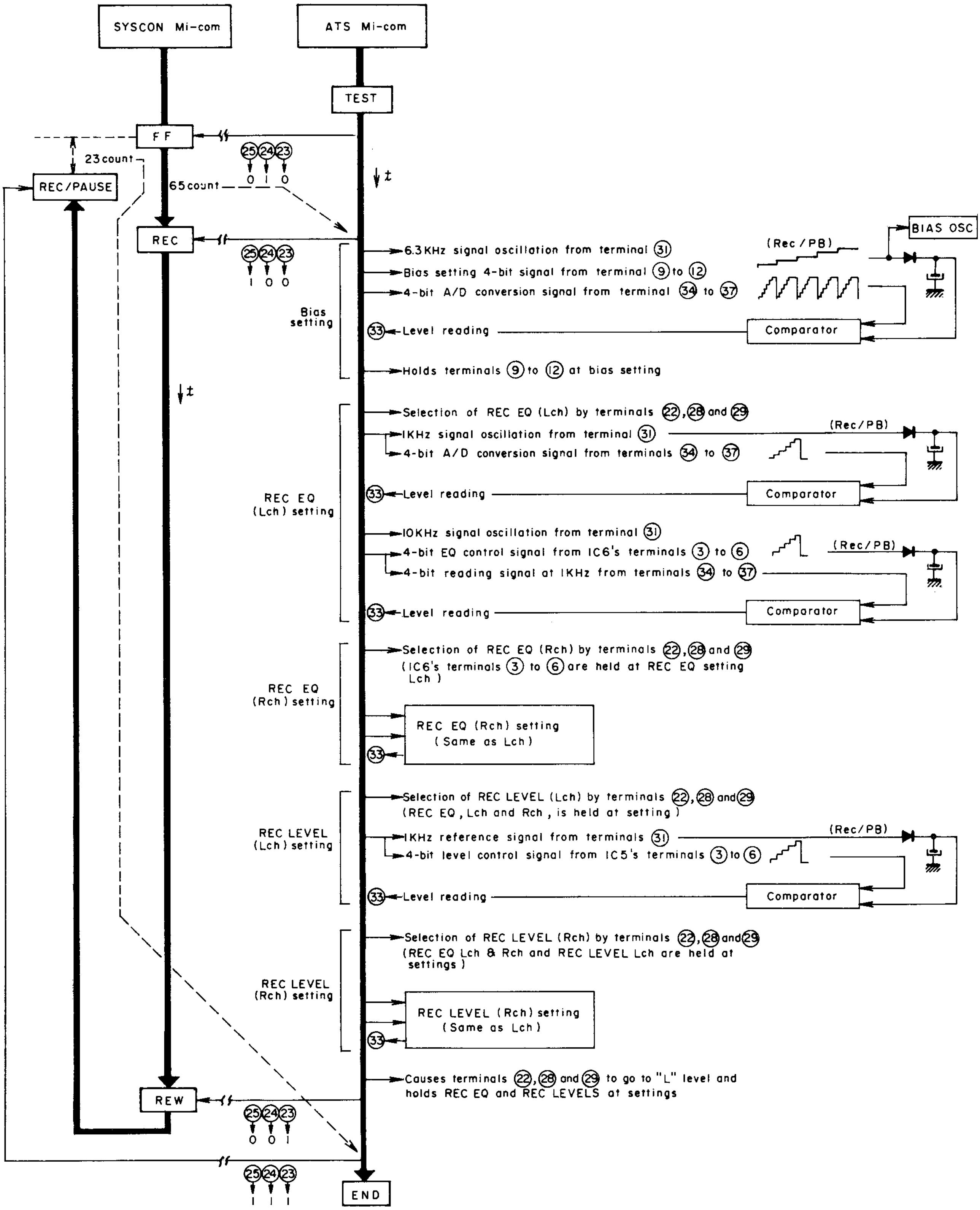

SYSCON Mi-com
ATS Mi-com
TEST
FF
23count
REC/PAUSE
65count
㉕㉔㉓
0 1 0
REC
㉕㉔㉓
1 0 0
t
Bias setting
►6.3KHz signal oscillation from terminal ㉛
►Bias setting 4-bit signal from terminal ⑨to ⑫
►4-bit A/D conversion signal from terminal ㉞ to ㊲
㉝◄Level reading
►Holds terminals ⑨to ⑫ at bias setting
(Rec/PB)
BIAS OSC
Comparator
REC EQ (Lch) setting
►Selection of REC EQ (Lch) by terminals ㉒,㉘ and ㉙
►1KHz signal oscillation from terminal ㉛
►4-bit A/D conversion signal from terminals ㉞ to ㊲
㉝◄Level reading
►10KHz signal oscillation from terminal ㉛
►4-bit EQ control signal from IC6's terminals ③ to ⑥
►4-bit reading signal at 1KHz from terminals ㉞ to ㊲
㉝◄Level reading
(Rec/PB)
Comparator
REC EQ (Rch) setting
►Selection of REC EQ (Rch) by terminals ㉒,㉘ and ㉙
(IC6's terminals ③ to ⑥ are held at REC EQ setting Lch)
REC EQ (Rch) setting
(Same as Lch)
㉝
REC LEVEL (Lch) setting
►Selection of REC LEVEL (Lch) by terminals ㉒,㉘ and ㉙
(REC EQ, Lch and Rch, is held at setting)
►1KHz reference signal from terminals ㉛
►4-bit level control signal from IC5's terminals ③to⑥
㉝◄Level reading
(Rec/PB)
Comparator
REC LEVEL (Rch) setting
►Selection of REC LEVEL (Rch) by terminals ㉒,㉘ and ㉙
(REC EQ Lch & Rch and REC LEVEL Lch are held at settings)
REC LEVEL (Rch) setting
(Same as Lch)
㉝
►Causes terminals ㉒,㉘ and ㉙ to go to "L" level and holds REC EQ and REC LEVELS at settings
REW
㉕㉔㉓
0 0 1
㉕㉔㉓
1 1 1
END

Fig. 17 General Flow of the ATS Operation

With ATS, depressing the TEST button causes the bias, Rec EQ and Rec level to be adjusted in that order.

The signal frequencies and settings involved at this time are as follows:

(1) Bias: Setting is made with a signal frequency of 6.3 kHz so that the peak bias is exceeded by 3 dB for Normal tape and by 4 dB for Metal and CrO_2 (SA) tape.
(2) Rec EQ: Setting is made with signal frequencies of 1 kHz and 10 kHz so that the record/playback level with 1 kHz is equal to that with 10 kHz.
(3) Rec level: Setting is made with 1 kHz so that the input level is equal to the record/playback level.

Fig. 17 shows the general flow of the ATS operation. The following is the explanation of circuits associated with ATS, which is then followed by detailed discussions on bias, Rec EQ and Rec level setting.

5-2. Clock Oscillator

Commands from and decisions by a microcomputer are all delivered in a specific sequence which is determined by signals known as clock pulses. These clock pulses are generated by a circuit called a clock oscillator. (See Fig. 18) The clock oscillator produces a clock pulse of 3.579545 MHz which is then supplied to the microcomputer.

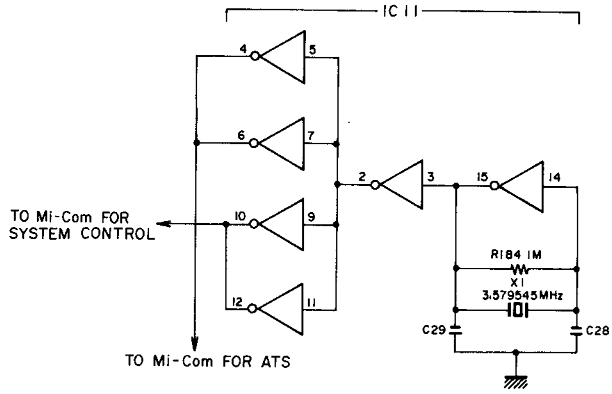

IC 11
4
5
6
7
10
9
12
11
2
3
15
14
TO Mi-Com FOR SYSTEM CONTROL
R184 1M
X1 3.579545MHz
C29
C28
TO Mi-Com FOR ATS

Fig. 18 Clock Oscillator

5-3. Generating ATS Reference Signals (1 kHz, 6.3 kHz and 10 kHz)

Signals of 1 kHz, 6.3 kHz and 10 kHz are required for the setting of the bias, Rec EQ and Rec level with ATS. Fig. 19 shows the circuitry employed for the purpose. The flow of the signals is illustrated below by frequency:

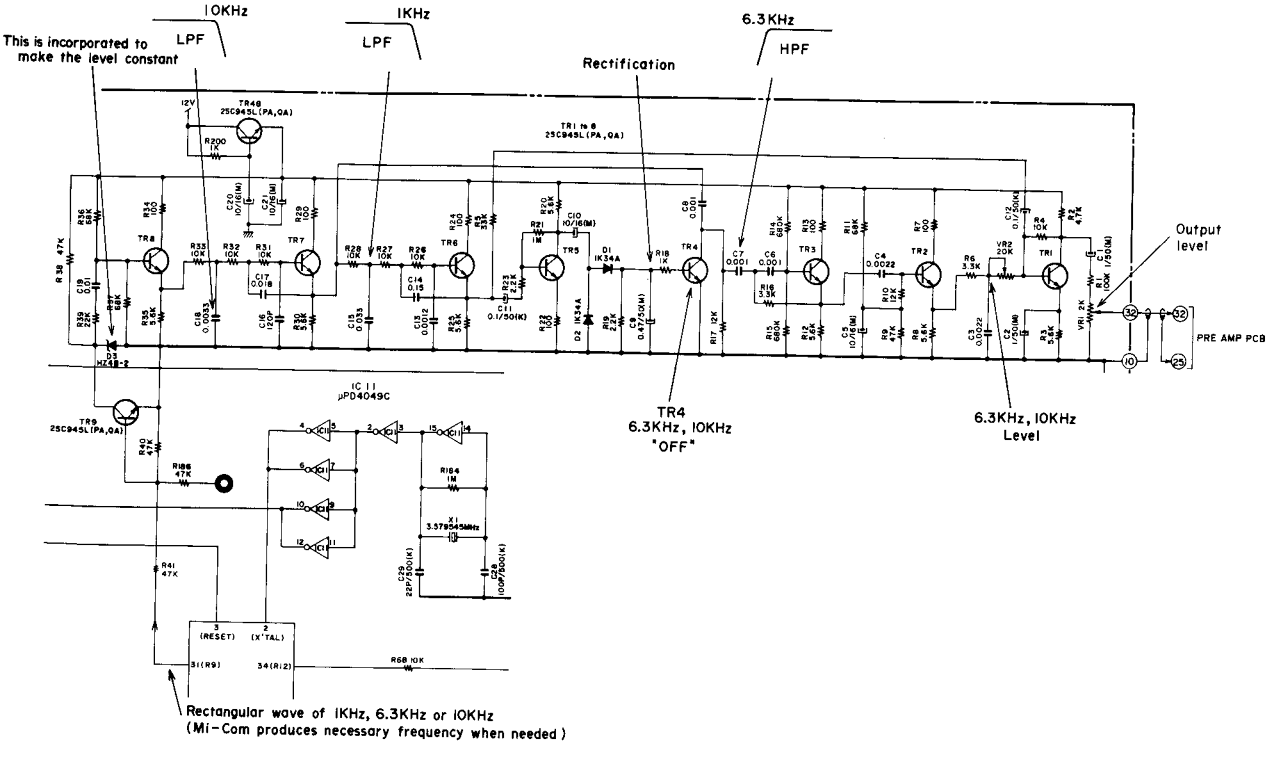

10KHz LPF
This is incorporated to make the level constant
1KHz LPF
Rectification
6.3KHz HPF
TR48 2SC945L(PA,QA)
TR1 to 8 2SC945L(PA,QA)
TR8
TR7
TR6
TR5
TR4
TR3
TR2
TR1
D1 1K34A
D2 1K34A
D3 HZ4B-2
TR9 2SC945L(PA,QA)
IC 11 µPD4049C
R184 1M
X1 3.579545MHz
C29 22P/50(K)
C28 100P/50(K)
R186 47K
R41 47K
R40 47K
(RESET)
(X'TAL)
31(R9)
34(R12)
R68 10K
Output level
PRE AMP PCB
TR4 6.3KHz, 10KHz "OFF"
6.3KHz, 10KHz Level
Rectangular wave of 1KHz, 6.3KHz or 10KHz
(Mi-Com produces necessary frequency when needed)

Fig. 19

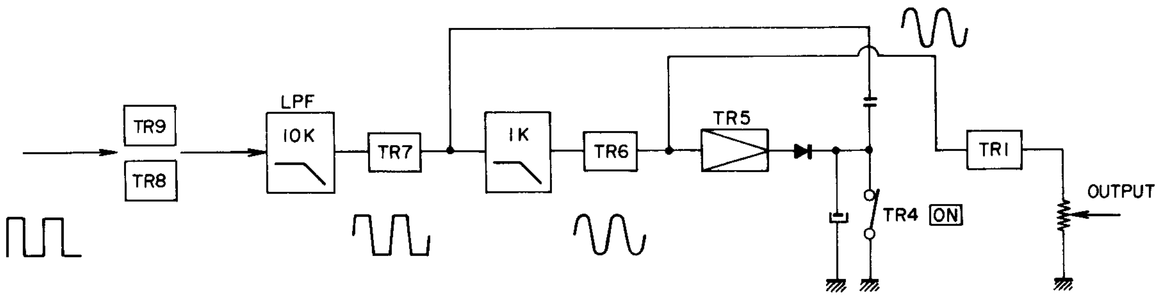

TR9
TR8
LPF
10K
TR7
1K
TR6
TR5
TR1
TR4 ON
OUTPUT

Fig. 20 Flow of 1 kHz-Signal

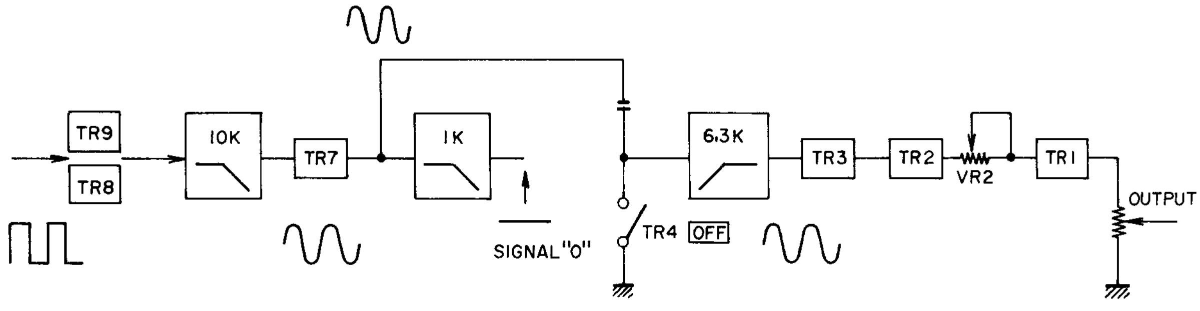

TR9
TR8
10K
TR7
1K
SIGNAL"0"
6.3K
TR4 OFF
TR3
TR2
VR2
TR1
OUTPUT

Fig. 21 Flow of 6.3 kHz-Signal

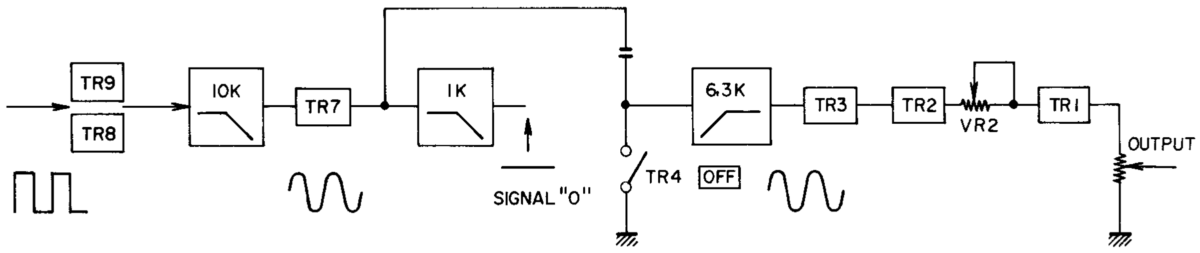

TR9
TR8
10K
TR7
1K
SIGNAL "0"
6.3K
TR4 OFF
TR3
TR2
VR2
TR1
OUTPUT

Fig. 22 Flow of 10 kHz-Signal

The microcomputer sends out a rectangular wave which contains "odd" harmonics. The basic sine wave can thus be obtained by removing the harmonics: for example, a rectangular wave of 6.3 kHz contains, in addition to a sine wave of 6.3 kHz, harmonic waves of 3 x 6.3 kHz, 5 x 6.3 kHz and so on, and the sine wave can be obtained by removing the harmonics.

When signals of 6.3 kHz and 10 kHz are passed through HPF (10 kHz), the 10 kHz-signal level drops significantly while the 6.3 kHz-signal level does not: to raise the 10 kHz signal level, a circuit is provided between TR2 and TR3.

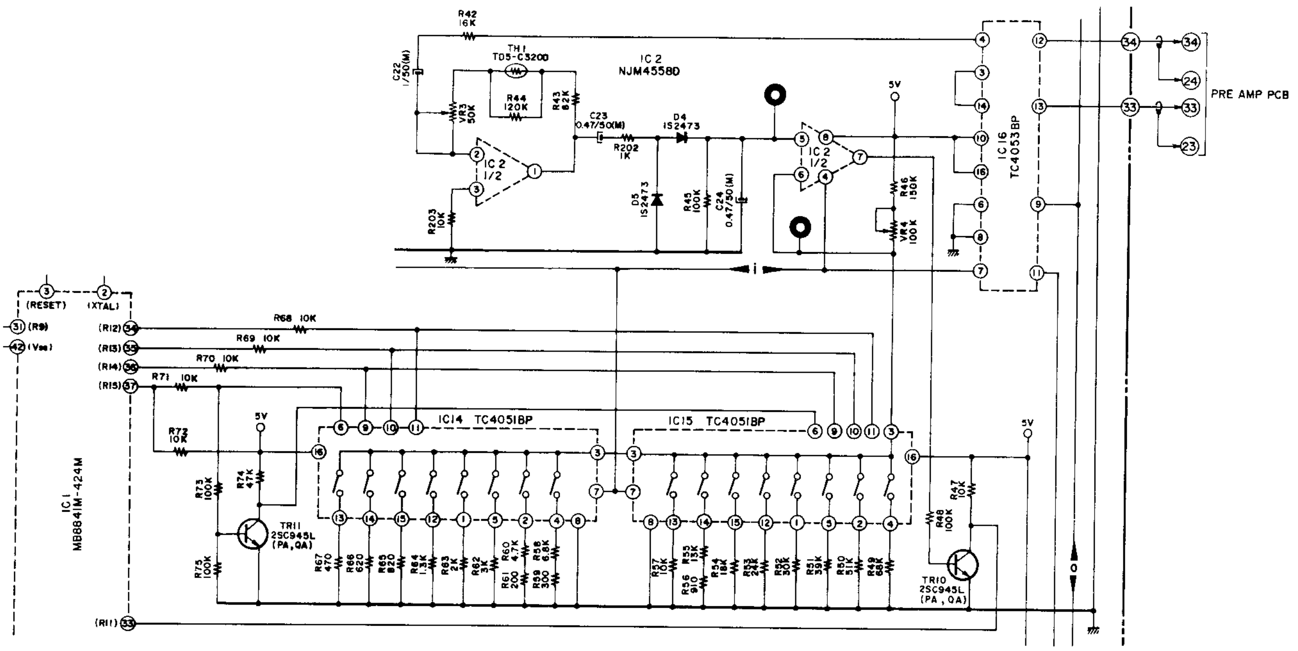

R42 16K
TH1 TD5-C3200
IC 2 NJM4558D
C22 1/50(M)
VR3 50K
R44 120K
R43 82K
C23 0.47/50(M)
D4 1S2473
R202 1K
IC 2 1/2
D5 1S2473
R45 100K
C24 0.47/50(M)
R203 10K
5V
R46 150K
VR4 100K
IC16 TC4053BP
PRE AMP PCB
(RESET)
(XTAL)
(R12)
(R13)
(R14)
(R15)
(R11)
R68 10K
R69 10K
R70 10K
R71 10K
R72 10K
R73 100K
R74 4.7K
R75 100K
IC14 TC4051BP
IC15 TC4051BP
IC1 MB8841M-424M
TR11 2SC945L (PA,QA)
TR10 2SC945L (PA,QA)
R47 10K
R48 100K

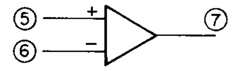
Fig. 23

5-4. Reading Signal Levels with ATS

The microcomputer employed with ATS is responsible for detecting record/playback signal levels. To adjust Rec EQ so that a flat frequency characteristic can be obtained at 1 kHz and 10 kHz, it is necessary to determine first the actual level of the 1 kHz-signal and then that of the 10 kHz signal.

The circuit used for this purpose is illustrated in Fig. 23, the action of which is described below:

1) The reproduced signal is supplied to ⑫ of IC16 (L-ch) or to ⑬ of IC16 (R-ch) from the Pre Amp PCB. The L-ch or R-ch signal (switching between L-ch and R-ch is done with the input to ⑪ of IC16) from ④ of IC16 is applied to ② of IC2 and, after leaving IC2 through ①, is converted to DC by D4, D5, C24, etc.
2) ⑤, ⑥ and ⑦ of 1/2 IC2 make up a comparator. The relationship given in Fig. 24 may be expressed in terms of waveform as shown in Fig. 25.
3) Supplied to ⑥ of IC2 is the step-like reference voltage which is generated by IC14, IC15, Microcomputer, TR11 and resistors connected to them. Fig. 26 illustrates the generation of the step-like reference voltage. Moving the switch (SW) in the direction shown causes various levels of voltage to be generated at TP2 as +5V is divided by R46, VR4 and R67, R66 . . . or R49. The actual switching between IC14 and IC15 is effected by controlling TR11, IC14 and IC15 with signals delivered from the microcomputer. The relationship between signals from the microcomputer and the action of IC's 14 and 15 is shown below:



⑦ goes to "1" if ⑤ is higher than ⑥
⑦ goes to "0" if ⑤ is lower than ⑥

Fig. 24

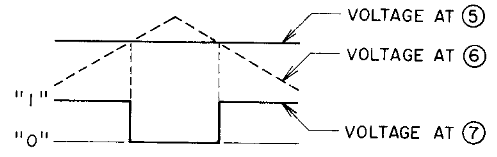

VOLTAGE AT ⑤
VOLTAGE AT ⑥
"1"
"0"
VOLTAGE AT ⑦

Fig. 25

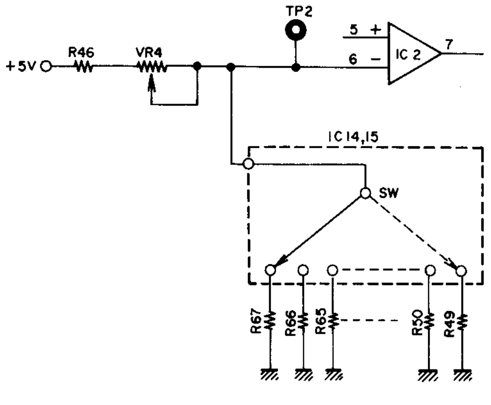

TP2
+5V
R46
VR4
5 +
6 −
IC 2
7
IC14,15
SW
R67
R66
R65
R50
R49

Fig. 26

Mi-Com outputs				IC14				IC15				Terminal connection	
㉞	㊲	㊱	㉟	⑥	⑪	⑩	⑨	⑥	⑪	⑩	⑨	IC14	IC15
0	0	0	0	0	0	0	0	1	0	0	0	13	X
0	0	0	1	0	0	0	1	1	0	0	1	14	X
0	0	1	0	0	0	1	0	1	0	1	0	15	X
0	0	1	1	0	0	1	1	1	0	1	1	12	X
0	1	0	0	0	1	0	0	1	1	0	0	1	X
0	1	0	1	0	1	0	1	1	1	0	1	5	X
0	1	1	0	0	1	1	0	1	1	1	0	2	X
0	1	1	1	0	1	1	1	1	1	1	1	4	X
1	0	0	0	1	0	0	0	0	0	0	0	X	13
1	0	0	1	1	0	0	1	0	0	0	1	X	14
1	0	1	0	1	0	1	0	0	0	1	0	X	15
1	0	1	1	1	0	1	1	0	0	1	1	X	12
1	1	0	0	1	1	0	0	0	1	0	0	X	1
1	1	0	1	1	1	0	1	0	1	0	1	X	5
1	1	1	0	1	1	1	0	0	1	1	0	X	2
1	1	1	1	1	1	1	1	0	1	1	1	X	4

0 : "L" Level 1 : "H" Level

Fig. 27

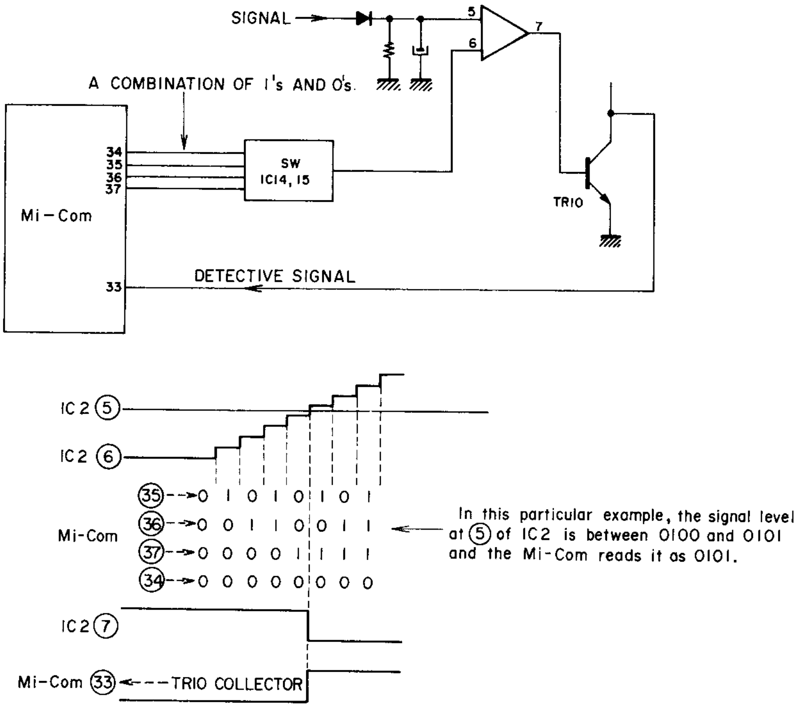

SIGNAL
5
6
7
A COMBINATION OF 1's AND 0's.
34
35
36
37
SW
IC14, 15
Mi-Com
TRIO
33
DETECTIVE SIGNAL
IC 2 ⑤
IC 2 ⑥
㉟--→0 1 0 1 0 1 0 1
Mi-Com ㊱--→0 0 1 1 0 0 1 1
㊲--→0 0 0 0 1 1 1 1
㉞--→0 0 0 0 0 0 0 0
In this particular example, the signal level at ⑤ of IC2 is between 0100 and 0101 and the Mi-Com reads it as 0101.
IC2 ⑦
Mi-Com ㉝←---TRIO COLLECTOR

Fig. 28 Detecting and Reading Signal Levels

4) Detecting and Reading Signal Levels

As seen above, terminal ⑥ of IC2 is supplied with the reference step voltage and terminal ⑤ with a DC voltage produced through rectification of the reproduced signal.

The reference voltage appearing at terminal ⑥ varies step-wise and thus exceeds the voltage at terminal ⑤ at a certain point, at which time the output at terminal ⑦ changes from "1" to "0". With the terminal ⑦ output changed from "1" to "0", the phase of TR10 is reversed, thereby notifying terminal ㉝ of the microcomputer that the signal has changed from "0" to "1". The microcomputer can tell the control signal (output at terminals ㉞ – ㊲) involved when the signal changed from "0" to "1", and remembers the bit combination of that control signal as a signal level detected. Thus, if the bit combination of the signal from terminals ㉞ – ㊲ is 0101, then 0101 is remembered as the value detected. What has been discussed above is illustrated in Fig. 28.

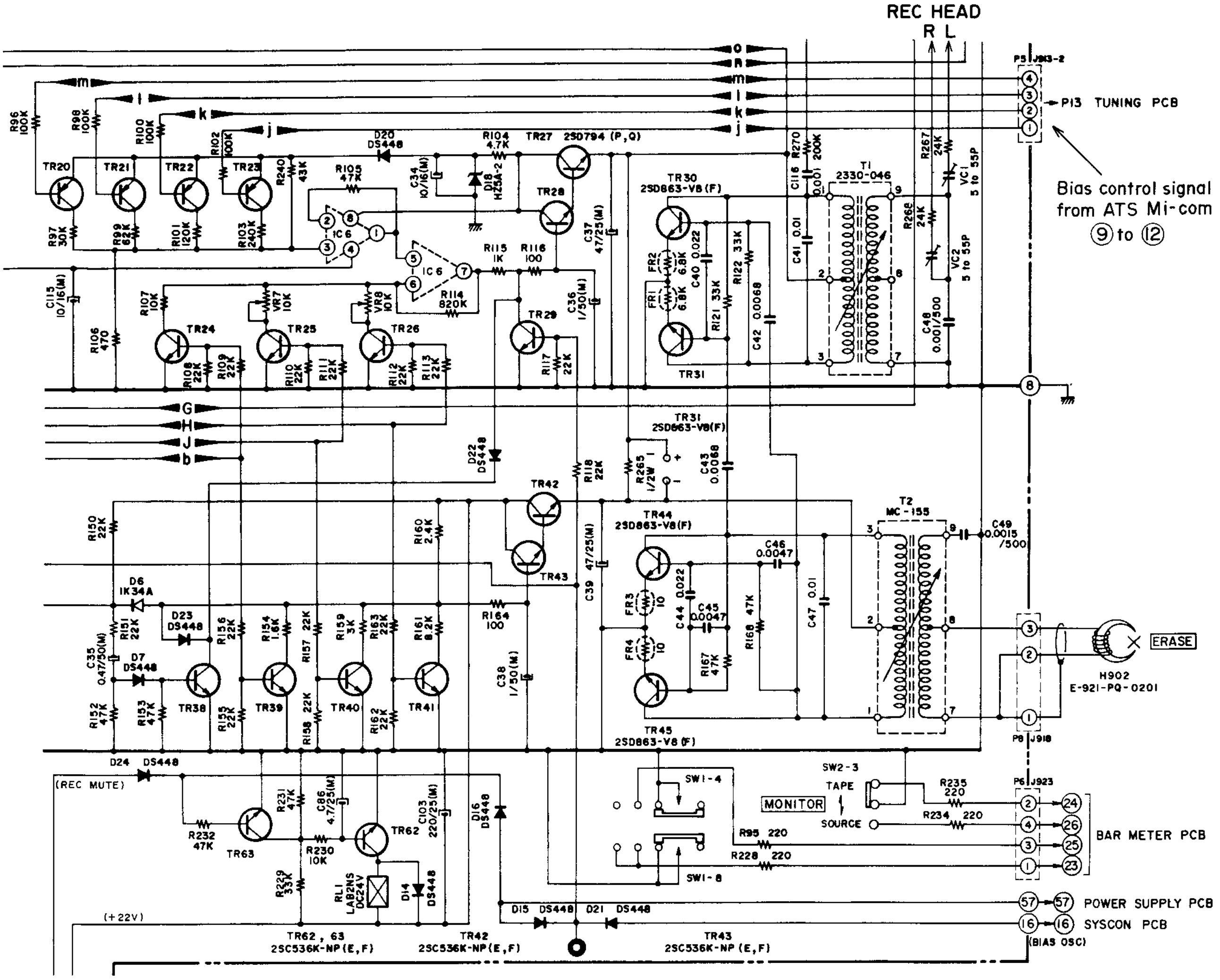

REC HEAD
R L
P13 TUNING PCB
Bias control signal
from ATS Mi-com
⑨to ⑫
TR20
TR21
TR22
TR23
TR24
TR25
TR26
TR27 2SD794 (P,Q)
TR28
TR29
TR30
2SD863-V8(F)
TR31
2SD863-V8(F)
T1
2330-046
IC6
TR42
TR43
TR44
2SD863-V8(F)
TR45
2SD863-V8(F)
T2
MC-155
TR38
TR39
TR40
TR41
ERASE
H902
E-921-PQ-0201
SW2-3
TAPE
MONITOR
SOURCE
SW1-4
SW1-8
BAR METER PCB
POWER SUPPLY PCB
SYSCON PCB
(BIAS OSC)
(REC MUTE)
(+22V)
TR62
TR63
RL1
LAB2NS
DC24V
TR62, 63
2SC536K-NP(E,F)
TR42
2SC536K-NP(E,F)
TR43
2SC536K-NP(E,F)

Fig. 29

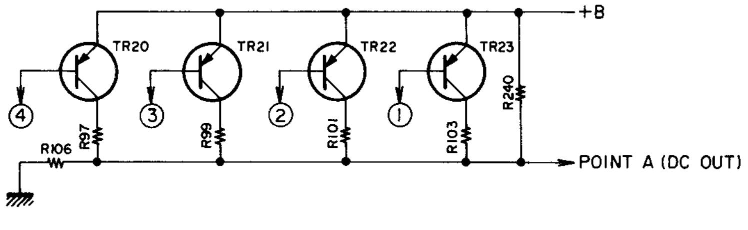
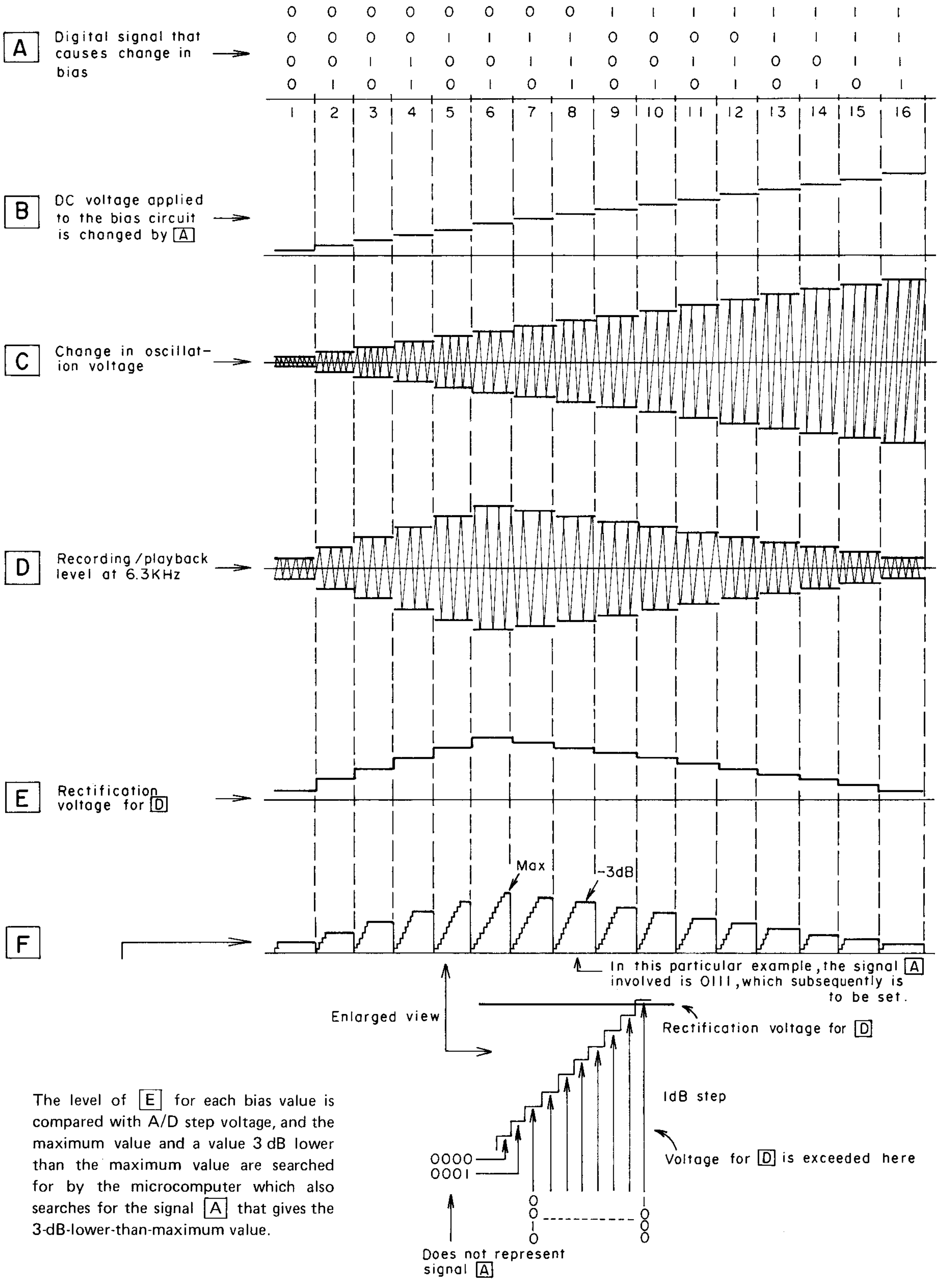

+B
TR20
TR21
TR22
TR23
R240
④
③
②
①
R106
R97
R99
R101
R103
POINT A (DC OUT)

Fig. 30

5-5. Bias Setting

A signal of 6.3 kHz is recorded and reproduced at the same time and then the playback level is checked by varying the amount of bias in 16 steps (from low to high). As this is done, the microcomputer recognizes the maximum output level and holds, or remembers, as a bias setting the step value which is over-biased by 3 dB (or 4 dB with metal and CrO_2 (SA)) from the step level involved. This bias values is used for subsequent Rec EQ and Rec level setting. The R-channel is used in the bias adjustment, which is repeated twice to take an average of the two step values obtained.


A Digital signal that causes change in bias
0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1
0 0 0 0 1 1 1 1 0 0 0 0 1 1 1 1
0 0 1 1 0 0 1 1 0 0 1 1 0 0 1 1
0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
B DC voltage applied to the bias circuit is changed by A
C Change in oscillation voltage
D Recording/playback level at 6.3KHz
E Rectification voltage for D
F
Max
-3dB
In this particular example, the signal A involved is 0111, which subsequently is to be set.
Enlarged view
Rectification voltage for D
1dB step
Voltage for D is exceeded here
0000
0001
0
0
1
0
1
0
0
0
Does not represent signal A

The level of E for each bias value is compared with A/D step voltage, and the maximum value and a value 3 dB lower than the maximum value are searched for by the microcomputer which also searches for the signal A that gives the 3-dB-lower-than-maximum value.

Fig. 31

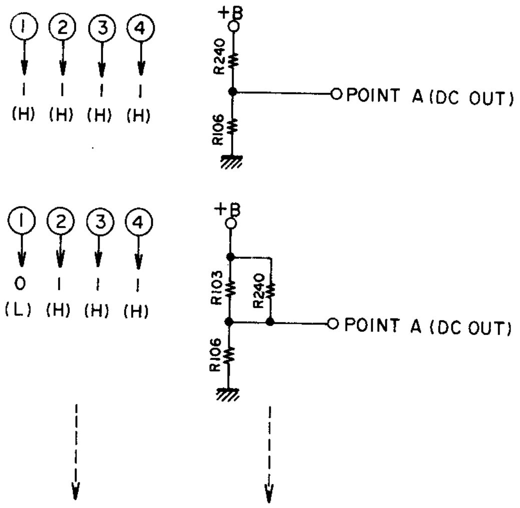


Fig. 32

If an error occurs, the adjustment is repeated. If the retry causes an error, then the adjustment is repeated once again (the fourth adjustment attempt). If the fourth attempt is still unsuccessful, the error is displayed externally and the operation stops after rewinding of the tape. Note that the use of the R-channel in bias adjustment helps to reduce ill effects caused mechanically by tape running.

The bias oscillation voltage can be varied as follows: In Fig. 30, the DC voltage at point A is varied by means of control signals ①, ②, ③ and ④.

As illustrated above, it is possible to vary the DC voltage at point A in 16 steps by causing inputs ① through ④ to be either 1s(H) or 0s(L).

This DC voltage at point A control TR27 and TR28 via the DC amp (IC6) to change the bias OSC DC supply voltage, and thereby vary the amplitude of oscillation voltage. In other words, the bias OSC output is varied by changing 1–0 (or H–L) combinations of outputs at terminals 9 – 12 of the microcomputer for ATS. Fig. 31 illustrates the steps involved in setting the bias.

5-6. Rec EQ (L-ch, R-ch)/Rec Level (L-ch, R-ch) Register Selection

The microcomputer for ATS is programmed so that the Rec EQ/Rec level setting is attempted twice for each of L-ch and R-ch. Switching between Rec EQ and Rec level and between L-ch and R-ch is effected by way of terminals ㉒, ㉘ and ㉙ (R_0, R_6 and R_7) of the microcomputer.

Fig. 33 shows the equivalent circuit and truth table of the IC TC4520BP. As can be seen from Fig. 33, when the enable terminal is at "1(H)" level, "Up Count" is effected by the clock pulse: when the reset terminal is at "1(H)" level, Q_1 through Q_4 are set to "0(L)" level.

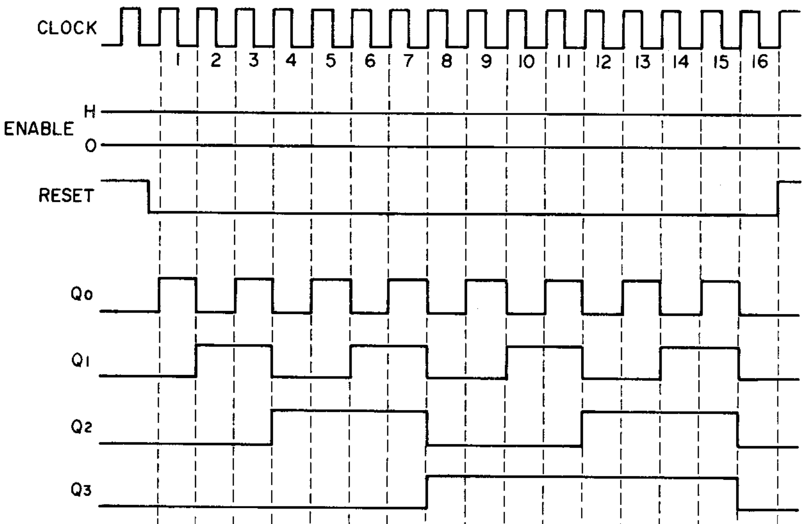
Fig. 34 shows register selection signals from the microcomputer.

The signals are used to control the enable terminal of each binary up-counter (IC5 of IC6) so as to permit selection of L-ch Rec EQ, R-ch Rec EQ, L-ch Rec level or R-ch Rec level.

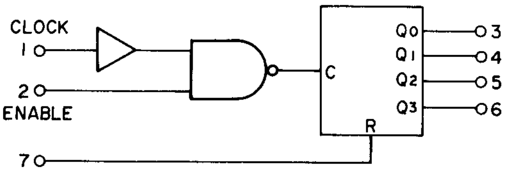
The enable terminal provides control to retain each register setting. For example, once the REC EQ (R-ch) setting has been made, the operation proceeds to the REC level (L-ch), at which time the enable terminal of the binary up-counter that controls REC EQ (R-ch) goes to "0(L)" level, thereby holding the value appearing at Q_0 through Q_3.

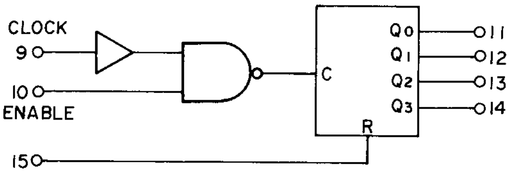
Since switching to either one of the four registers (the ones for Rec EQ and Rec level setting) is done by way of the enable terminal, if one of the registers has its value being set, the remaining registers will have their settings in "held" state. Upon completion of the ATS operation, the enable terminal of each register goes to "0(L)" level, causing the set Rec EQ and Rec level to be held as they are.

L-ch/R-ch selection is made with a NAND gate (IC4) and the signal is applied to terminal ⑪ of IC16 to switch over the signal from the PB amp for delivery to the A/D converter. (See Fig. 35)


CLOCK
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
ENABLE
H
0
RESET
Qo
Q1
Q2
Q3

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Q_0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0
Q_1	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0
Q_2	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0
Q_3	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0


CLOCK
1
2
ENABLE
7
C
R
Qo
Q1
Q2
Q3
3
4
5
6


CLOCK
9
10
ENABLE
15
C
R
Qo
Q1
Q2
Q3
11
12
13
14

CLOCK	ENABLE	RESET	ACTION
↑	1	0	INCREMENT COUNTER
0	↓	0	INCREMENT COUNTER
↓	X	0	NO CHANGE
X	↑	0	NO CHANGE
↑	0	0	NO CHANGE
1	↓	0	NO CHANGE
X	X	1	Q_0 THRU Q_3 = 0

X = Don't care.

Fig. 33 TC4520BP

PORT / RESISTER	R_0	R_6	R_7
EQUALIZER(Lch)	0	1	0
EQUALIZER(Rch)	0	0	1
LEVEL(Lch)	1	0	0
LEVEL(Rch)	0	0	0

Fig. 34

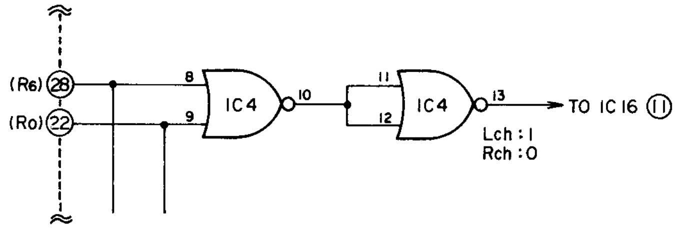
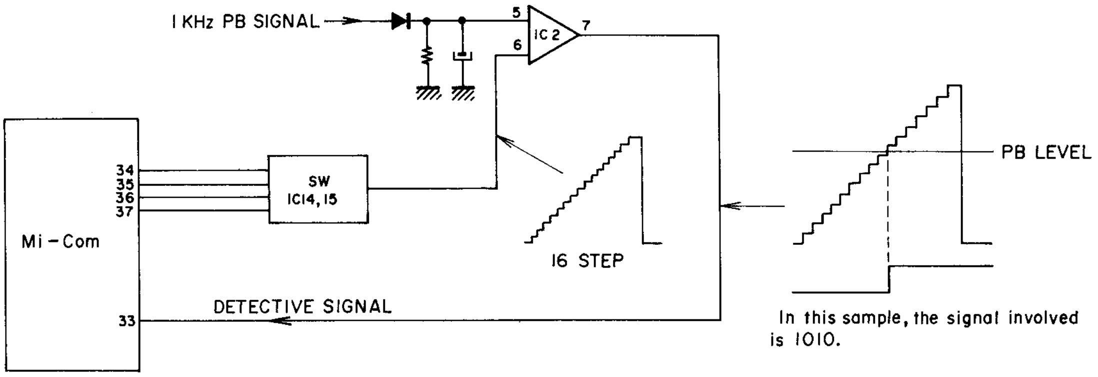

(R6) 28
(Ro) 22
8
9
IC4
10
11
12
IC4
13
TO IC16 ⑪
Lch : 1
Rch : 0

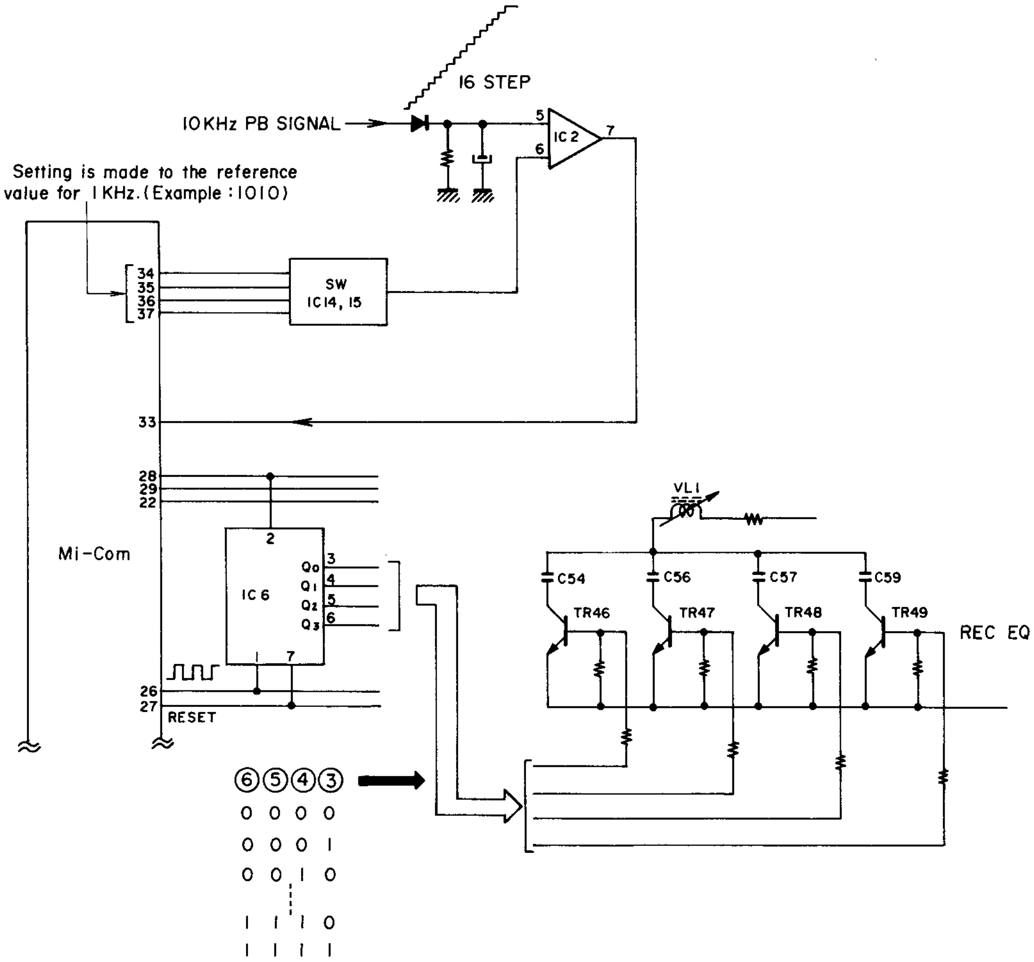
Fig. 35

5-7. Rec EQ Setting



I KHz PB SIGNAL
IC 2
5
6
7
Mi-Com
34
35
36
37
SW
IC14, 15
16 STEP
PB LEVEL
33
DETECTIVE SIGNAL
In this sample, the signal involved is 1010.

Fig. 36



16 STEP
10KHz PB SIGNAL
IC 2
5
6
7
Setting is made to the reference value for 1 KHz. (Example : 1010)
34
35
36
37
SW
IC14, 15
33
28
29
22
Mi-Com
2
IC 6
Q0
Q1
Q2
Q3
3
4
5
6
1
7
26
27
RESET
VL1
C54
C56
C57
C59
TR46
TR47
TR48
TR49
REC EQ
⑥⑤④③
0 0 0 0
0 0 0 1
0 0 1 0
1 1 1 0
1 1 1 1

Fig. 37

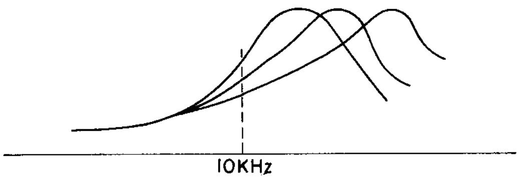


Fig. 38 Change in Rec EQ.

In Rec EQ setting, the Rec EQ is made to vary to match the record/playback level at 10 kHz with that at 10 kHz with that at 1 kHz so that a flat frequency characteristic can be obtained for recording/playback. Since no appropriate Rec level is not determined yet, a signal of 1 kHz (about −20 VU) is recorded and reproduced and the playback level is memorized. This is followed by the recording/playback of a 10 kHz signal.

At this point, the Rec EQ's variable circuit (pre amp's TR46 – TR49) is switched in 16 steps with the use of the binary up- counter (IC5 or IC6).

Of the A/D conversion step values for the 10 kHz PB level, the EQ value that gives the step value whose level is the same as that obtained with 1 kHz is memorized as a value to be set.

As shown in Fig. 37, a 1 kHz playback signal is supplied to the A/D converter circuit, at which time terminal ⑥ of IC2 is supplied with voltages in 16 steps by the use of 4-bit signals from terminals ㉞ – ㊲ of the microcomputer. The 4-bit signal appearing at terminals ㉞ through ㊲ when the step level has become equal to the 1 kHz playback level is memorized as the detection level for 1 kHz, and the voltage applied to terminal ⑥ of IC2 at that time is taken as the reference voltage for 1 kHz.

The serial data (clock pulse) from terminal ㉖ of the microcomputer is used to vary the 4-bit signal that appears at Q_0 – Q_3 of IC5 or IC6. (At this time, a 10 kHz recording signal is supplied.)

As the 4-bit signal (0000 through 1111) from IC5 or IC6 varies, TRs 46 through 49 of the Rec EQ are turned on/off to change the value of "C" connected to VL1 so as to alter the resonance frequency with VL1.

Since the C and VL1 are in the Rec amp's NFB circuit made up of TRs 32 through 36, the amount of NFB is changed by the frequency. (See Fig. 37.)

All this results in the frequency characteristic of the signal being changed as shown in Fig. 38.

In this manner, the 10 kHz PB level is changed in 16 steps through change in Rec EQ and the Serial data appearing at terminal ㉖ of the microcomputer when the step level has become equal to the reference voltage for 1 kHz is memorized for Rec EQ setting.

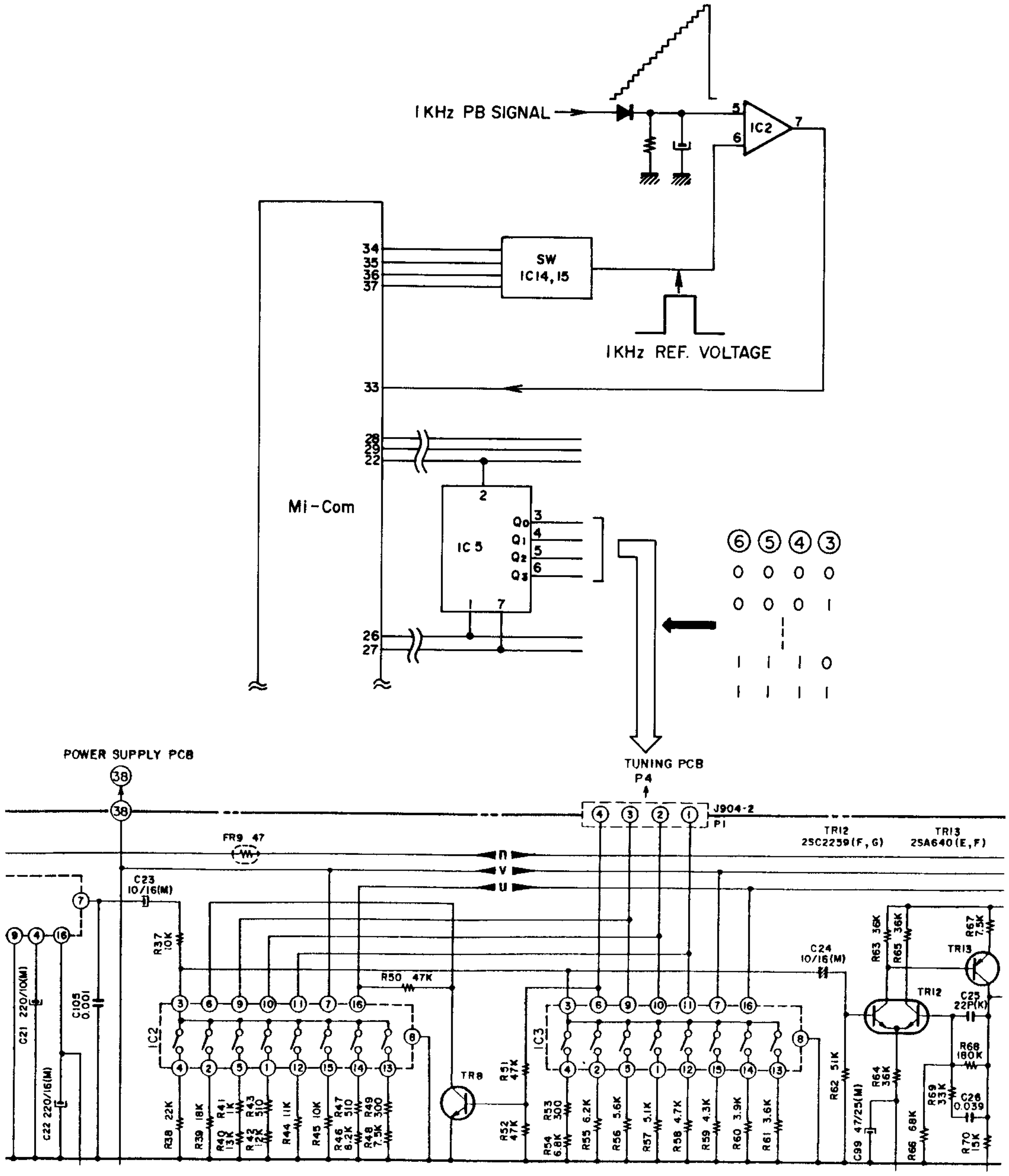

1KHz PB SIGNAL
IC2
5
6
7
34
35
36
37
SW
IC14,15
1KHz REF. VOLTAGE
33
28
29
22
Mi-Com
2
IC 5
Q0
Q1
Q2
Q3
3
4
5
6
1
7
26
27
⑥⑤④③
0 0 0 0
0 0 0 1
1 1 1 0
1 1 1 1
POWER SUPPLY PCB
㊳
TUNING PCB
P4
J904-2
P1
TR12
2SC2259(F,G)
TR13
2SA640(E,F)
FR9 47
C23
10/16(M)
C21 220/10(M)
C22 220/16(M)
C105
0.001
R37
10K
R50 47K
IC2
IC3
TR8
R51
47K
R52
47K
C24
10/16(M)
R62 51K
C99 47/25(M)
R63 36K
R65 36K
R64 36K
R66 68K
R67
7.5K
C25
22P(K)
R68
180K
R69
33K
C26
0.039
R70
15K
R38 22K
R39 18K
R40 13K
R41 1K
R42 12K
R43 510
R44 11K
R45 10K
R46 8.2K
R47 510
R48 7.5K
R49 300
R53 300
R54 6.8K
R55 6.2K
R56 5.6K
R57 5.1K
R58 4.7K
R59 4.3K
R60 3.9K
R61 3.6K

Fig. 39 Rec Level Setting

5-8. Rec Level Setting

In Rec level setting, the 1 kHz reference voltage supplied to terminal ⑥ of IC2 is compared with the 1 kHz PB level, and the serial data (clock pulse) appearing at terminal ㉖ of the microcomputer when the PB level has become equal to the reference voltage is memorized as a value to be set.

The steps involved in the Rec level setting are as follows:

First, a programmed 4-bit signal appears at terminals ㉞ through ㊲ of the microcomputer and the 1 kHz reference voltage is applied to terminal ⑥ of IC2. Then, a 1 kHz signal is recorded and reproduced and the PB level is applied to terminal ⑤ of IC2, at which time the binary up-counter is operated, as in the case of Rec EQ setting, by the serial data from terminal ㉖ of the microcomputer to change the Rec level in 16 steps with IC2/IC3 of the Rec amp. Finally, the serial data appearing when the reference voltage has become equal to the PB level is memorized as a value to be set as the Rec level.

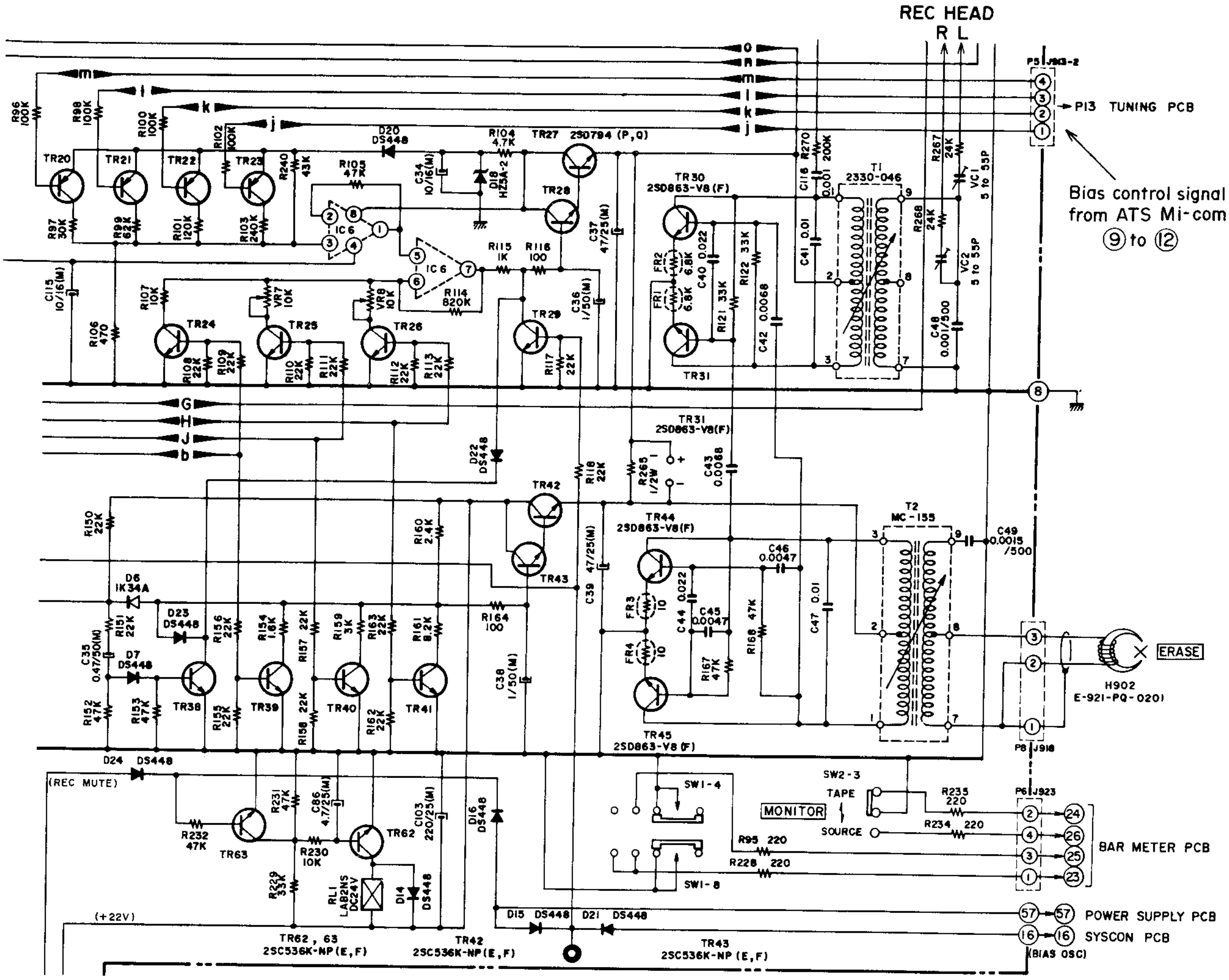

REC HEAD
R L
P13 TUNING PCB
Bias control signal from ATS Mi-com ⑨ to ⑫
TR27 2SD794 (P,Q)
TR30 2SD863-V8 (F)
T1 2330-046
TR31 2SD863-V8(F)
T2 MC-155
TR44 2SD863-V8 (F)
TR45 2SD863-V8 (F)
ERASE
H902 E-921-PQ-0201
(REC MUTE)
MONITOR
TAPE
SOURCE
SW1-4
SW1-8
SW2-3
BAR METER PCB
POWER SUPPLY PCB
SYSCON PCB
(BIAS OSC)
(+22V)
TR62, 63 2SC536K-NP(E,F)
TR42 2SC536K-NP(E,F)
TR43 2SC536K-NP (E,F)

Fig. 40 Bias Oscillation Circuit

5-9. Bias Oscillation Circuit and Associated Circuits

1) Bias Oscillation Circuit

The original bias OSC circuit is one made up of TR44, TR45 and T2.

The oscillation frequency is determined by C47, T2.

The main bias OSC circuit is one that consists of TR30, TR31 and T1.

The main OSC is driven by the original OSC via C42 and C43, and oscillates at the same frequency. This two-stage configuration is required to parmit the bias voltage to be varied greatly: with one-stage construction, stabilized oscillation cannot be ensured.

2) TRs 66 – 68 and associated circuits

This circuit is incorporated to ensure safety. With the oscillation circuit not oscillating for some reason or other, a large current flows through the oscillation circuit. This circuit provides a means of lowering the voltage to be applied to the oscillation circuit when it is not oscillating.

With the oscillation circuit oscillating properly, AC voltage is directed to the rectification circuit (D27) through C116 and R270 and turns on TR66. On the other hand, DC voltage is supplied to the base of TR67 via D26 and R273 from the emitter of TR27 (main OSC's DC voltage).

TR67 and TR68 make up a schmidt trigger circuit. If TR67's base voltage is higher than a certain voltage, TR67 is turned on and TR68 turned off, whereas if TR67's base voltage is lower than a certain value, TR67 is turned off and TR68 turned on.

A thyristor gate is connected to the collector of TR68 via R280, R281 and C119. When voltage is applied to the thyristor gate, the thyristor is turned on. With the OSC circuit oscillating properly, TR66 is turned on and thus the voltage applied to the base of TR66 is lowered with TR67 being OFF and TR68 being ON. For this reason, no voltage is applied to the thyristor gate, which results in the thyristor being OFF.

When the bias OSC circuit stops functioning, TR66 is turned off, which in turns the thyristor on, thereby lowering the voltage to be supplied to the bias OSC circuit.

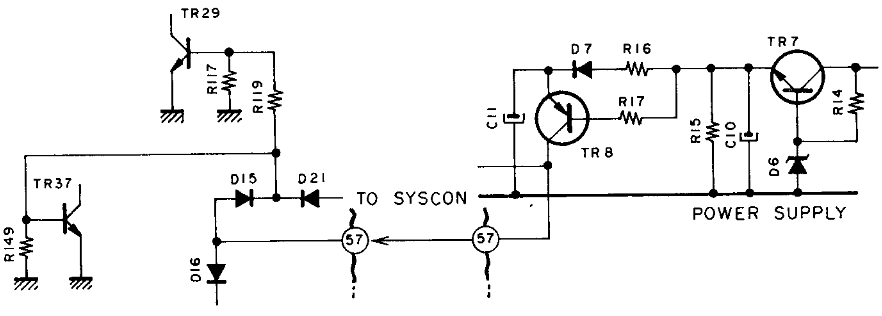

TR29
R117
R119
TR37
R149
D15
D21
TO SYSCON
D16
57
57
C11
TR8
D7
R16
R17
R15
C10
D6
TR7
R14
POWER SUPPLY

Fig. 41

3) Function of TR29 and TR37

The circuit shown in Fig. 41 provides control over activating/deactivating the bias OSC circuit. In other than the Rec mode, "H" is applied to the bases of TR29 and TR37 from the system control via D21 to deactivate the bias OSC. In the Rec mode, the base potential is caused to be at "L" level to turn off TR29 and TR37, thereby activating the bias OSC.

TR38 delays the start of oscillation through C35 and R51 to prevent the bias OSC from being activated as soon as the Rec mode is established. (This feature helps to reduce click noise.)

As can be seen from Fig. 41, the bases of TR29 and TR37 are connected to the power supply circuit via D15. TR8 is normally off because no base bias is applied to it, with both C11 and C10 being charged.

If the power supply is turned off while the bias OSC circuit is oscillating, C10 discharges immediately but C11 can not. The base of TR8 is grounded by R17 and R15 and its emitter is forward biased-because of the charged large-capacity condenser connected to it, causing the electric charge in C11 to be delivered to terminal ㊼ through TR8.

Immediately after the power is turned off, bias oscillation is stopped, and RL1 is actuated at the same time to stop the signal to the Rec head.

6. EXPLANATION OF SYSCON CIRCUIT ACTION

The syscon circuit also incorporates a microcomputer which provides function mode switching, control of the reel motor, plunger, etc. TIME/TAPE counter display and so forth. Fig. 42 shows terminal connections on the microcomputer (MB8841M-373M).

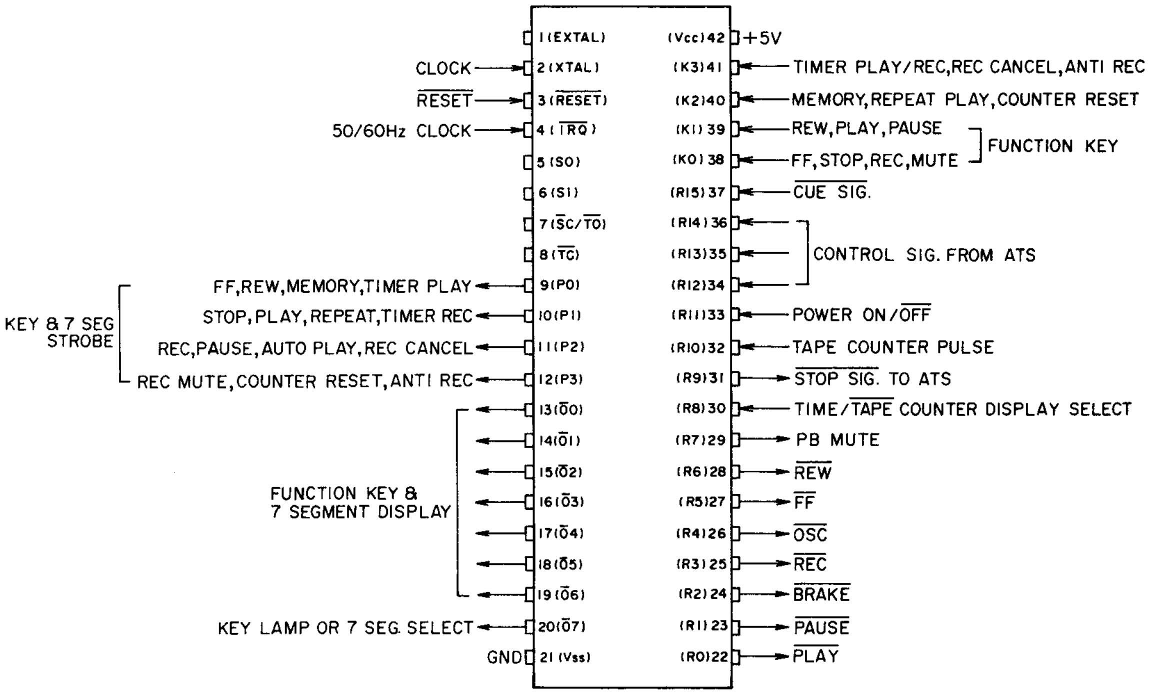

1 (EXTAL)
CLOCK
2 (XTAL)
RESET
3 (RESET)
50/60Hz CLOCK
4 (IRQ)
5 (SO)
6 (SI)
7 (SC/TO)
8 (TC)
KEY & 7 SEG STROBE
FF,REW,MEMORY,TIMER PLAY
9 (PO)
STOP,PLAY,REPEAT,TIMER REC
10 (P1)
REC,PAUSE,AUTO PLAY,REC CANCEL
11 (P2)
REC MUTE,COUNTER RESET,ANTI REC
12 (P3)
13 (O0)
14 (O1)
15 (O2)
FUNCTION KEY & 7 SEGMENT DISPLAY
16 (O3)
17 (O4)
18 (O5)
19 (O6)
KEY LAMP OR 7 SEG. SELECT
20 (O7)
GND
21 (Vss)
(Vcc) 42
+5V
(K3) 41
TIMER PLAY/REC,REC CANCEL,ANTI REC
(K2) 40
MEMORY,REPEAT PLAY,COUNTER RESET
(K1) 39
REW,PLAY,PAUSE
FUNCTION KEY
(K0) 38
FF,STOP,REC,MUTE
(R15) 37
CUE SIG.
(R14) 36
(R13) 35
CONTROL SIG. FROM ATS
(R12) 34
(R11) 33
POWER ON/OFF
(R10) 32
TAPE COUNTER PULSE
(R9) 31
STOP SIG. TO ATS
(R8) 30
TIME/TAPE COUNTER DISPLAY SELECT
(R7) 29
PB MUTE
(R6) 28
REW
(R5) 27
FF
(R4) 26
OSC
(R3) 25
REC
(R2) 24
BRAKE
(R1) 23
PAUSE
(R0) 22
PLAY

Fig. 42 Terminal Connections on the Microcomputer for Syscon

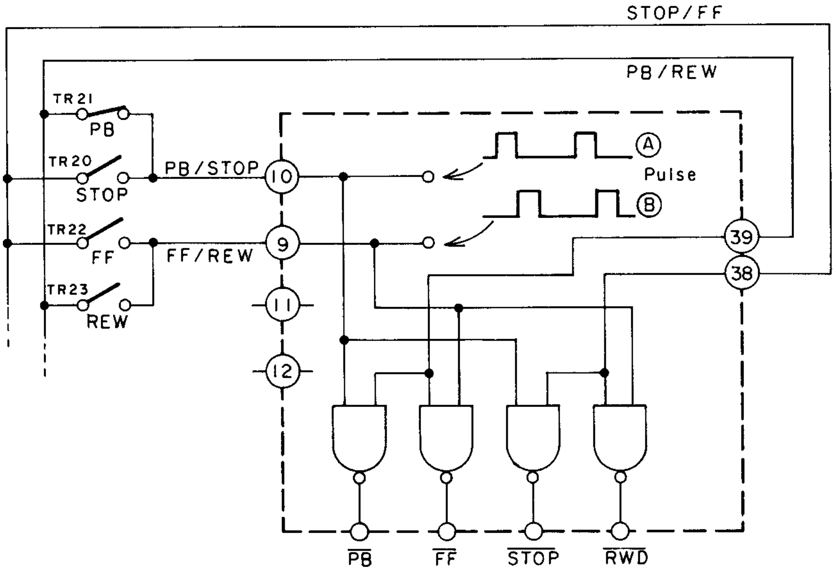
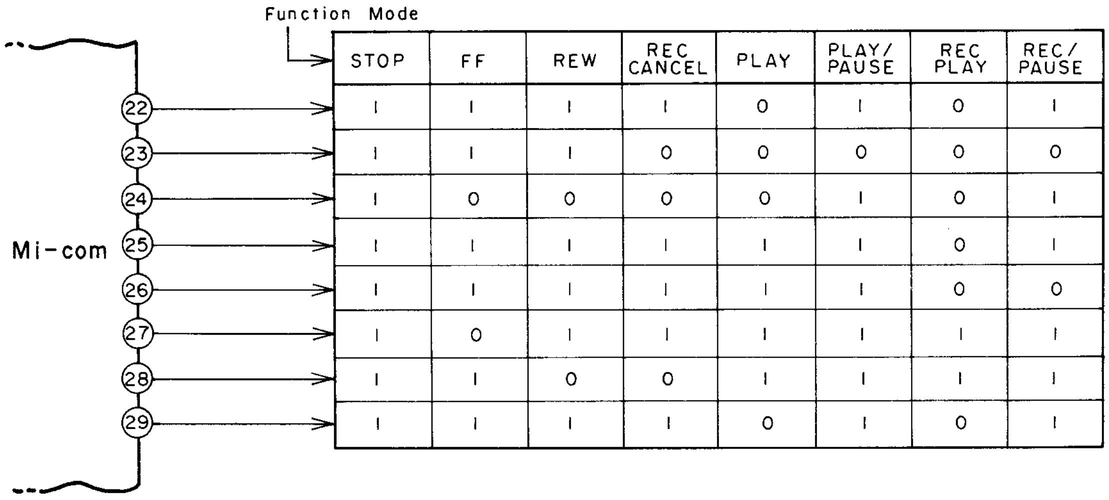


Fig. 43 Operating Principle of Function Mode Selector



Function Mode	STOP	FF	REW	REC CANCEL	PLAY	PLAY/ PAUSE	REC PLAY	REC/ PAUSE
㉒	1	1	1	1	0	1	0	1
㉓	1	1	1	0	0	0	0	0
㉔	1	0	0	0	0	1	0	1
㉕	1	1	1	1	1	1	0	1
㉖	1	1	1	1	1	1	0	0
㉗	1	0	1	1	1	1	1	1
㉘	1	1	0	0	1	1	1	1
㉙	1	1	1	1	0	1	0	1

Fig. 44

6-1. Function Mode Selector Circuit

The timing of pulses from the microcomputer is used to provide control over selection of each function mode. In the accompanying diagram, only four modes (PLAY, FF, REW and STOP) are shown for simplicity.

Pulses of different timing always appear at terminals ⑨ – ⑫ of the microcomputer. When the PLAY key is depressed, the PB switch (TR21) is closed, permitting the pulse Ⓐ from terminal ⑩ to be routed to terminal ㊴ and then to a NAND gate within the microcomputer.

The NAND gates are always supplied with pulses Ⓐ and Ⓑ internally, and thus a pulse appears at the output of the NAND gate which matches in timing with the pulse Ⓐ from terminal ㊴. This pulse is used to determine which of the function mode keys was depressed, and control the plunger drive, reel motor drive, etc. connected to output terminals R_0–R_7 of the microcomputer so as to establish the appropriate function mode.

Fig. 44 illustrates the state of the microcomputer in each function mode.

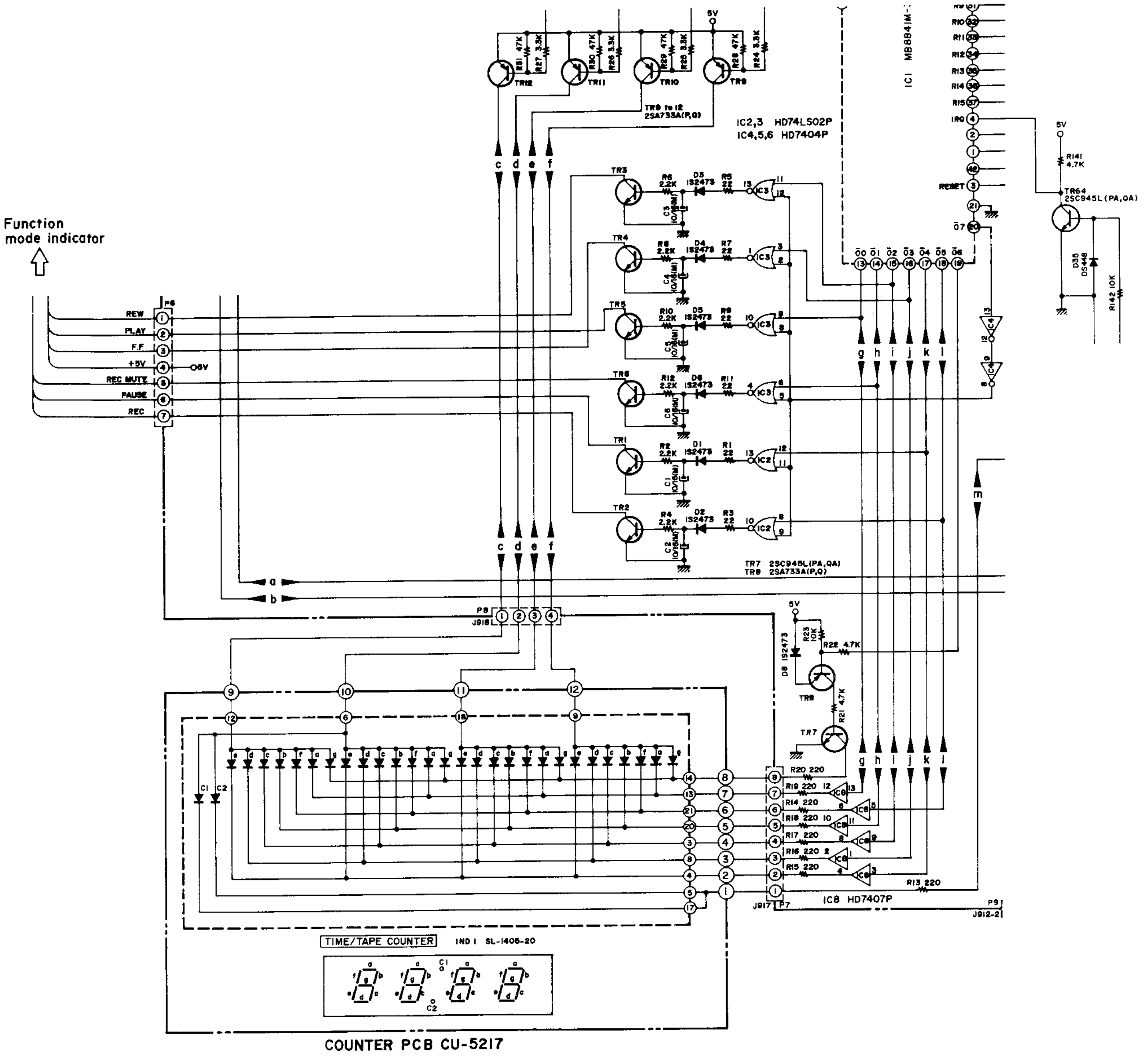

Function mode indicator
REW
PLAY
F.F
+5V
REC MUTE
PAUSE
REC
TR1
TR2
TR3
TR4
TR5
TR6
TR7
TR8
TR9
TR10
TR11
TR12
TR9 to 12 2SA733A(P,Q)
IC2,3 HD74LS02P
IC4,5,6 HD7404P
IC1 MB8841M
RESET
5V
R141 4.7K
TR64 2SC945L(PA,QA)
R142 10K
TR7 2SC945L(PA,QA)
TR8 2SA733A(P,Q)
IC8 HD7407P
TIME/TAPE COUNTER
IND1 SL-1405-20
COUNTER PCB CU-5217

Fig. 45 Function mode Indicator Activation and Counter Display Circuits

6-2. Function Mode Indicator Activation Circuit and Counter Display Circuit

1) Function Mode Indicator Activation Circuit

The timing of control signals from the microcomputer is also used to cause the indicator for each function mode to come on.

Given here is an explanation of the PLAY/PAUSE mode illustrated as an example in Fig. 46. In the PLAY/PAUSE mode, the function mode indicator PAUSE stays "on", while the PLAY indicator blinks. The "Function Mode Ind." column (from O_0 through O_5) in Fig. 46 indicates that PAUSE IND is at "L" level, PLAY IND at "L/H" (blink) and the other INDs all at "H" level.

The signal (O_0 through O_5) plus the signal O_7 are supplied to NOR gates shown in Fig. 45. Shown above as an example is the PAUSE indicator activation circuit. Since both O_4 and O_7 are at "L" level (see the "Function Mode Ind." column), a waveform shown at ③ appears at terminal ⑬ of IC2.

The waveform is then rectified to turn TR1 on, thereby causing the PAUSE indicator to come on. Similarly, the PLAY indicator comes on and blinks only when the O_0 signal coincides with the signal O_7 at "L" level.

As discussed above, each mode indicator is activated by supplying the O_7 and O_0-O_5 outputs from the microcomputer to the appropriate NOR gate and then turning TR1 – 6 on according to the operation timing.

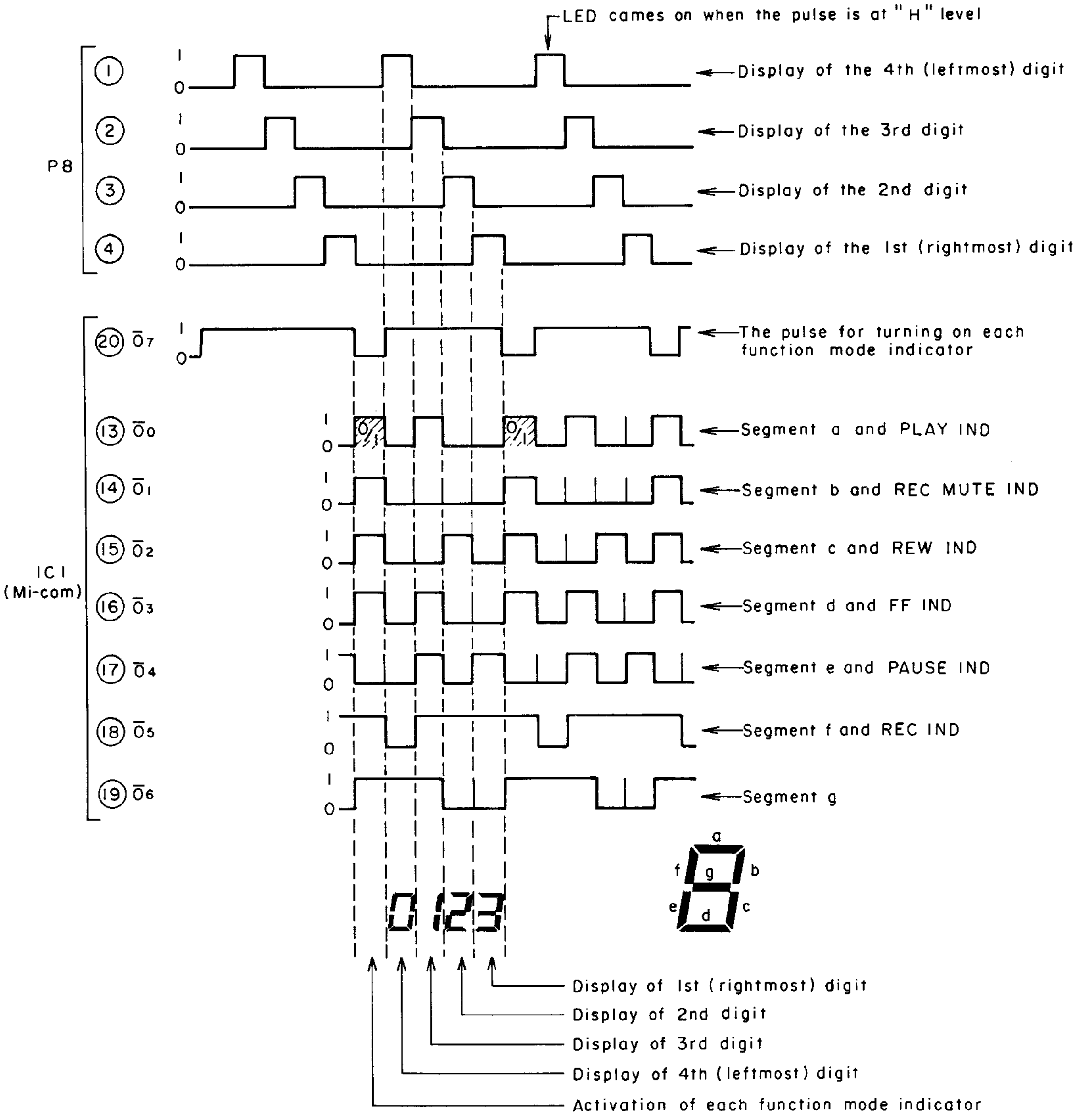

LED cames on when the pulse is at "H" level
P8
①
②
③
④
1
0
Display of the 4th (leftmost) digit
Display of the 3rd digit
Display of the 2nd digit
Display of the 1st (rightmost) digit
IC1 (Mi-com)
⑳ Ō7
The pulse for turning on each function mode indicator
⑬ Ō0
Segment a and PLAY IND
⑭ Ō1
Segment b and REC MUTE IND
⑮ Ō2
Segment c and REW IND
⑯ Ō3
Segment d and FF IND
⑰ Ō4
Segment e and PAUSE IND
⑱ Ō5
Segment f and REC IND
⑲ Ō6
Segment g
0/1
0123
a
b
c
d
e
f
g
Display of 1st (rightmost) digit
Display of 2nd digit
Display of 3rd digit
Display of 4th (leftmost) digit
Activation of each function mode indicator

Fig. 46

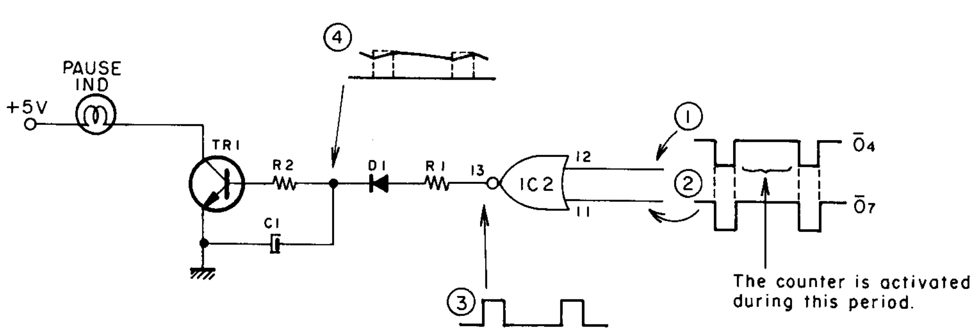

④
PAUSE IND
+5V
TR1
R2
D1
R1
13
IC2
12
11
C1
①
②
Ō4
Ō7
③
The counter is activated during this period.

Fig. 47 PAUSE Indicator Activation Circuit

2) Counter Display Circuit

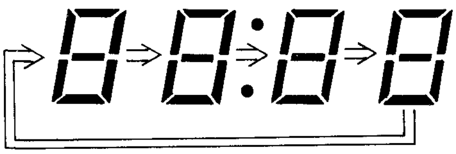


Fig. 48

Display of the counter is also controlled by pulses from the microcomputer. It should be noted here that each digit of the counter is not kept "on" at all times. If the counter is displayed by shifting each digit to be lighted in sequence as shown in Fig. 48, the digits still look as if they were kept "on" all the time thanks to the after-image effect of our eyes.

This is the principle on which a system known as the dynamic display system is based. Fig. 46 shows the timing chart of the dynamic display system. The waveforms appearing at ① through ④ of P8 are used to shift each LED digit to be lighted in sequence: for example, it can be seen from Fig. 46 that the rightmost digit comes on only when the waveform P8 ④ is at "H" level. The signal levels appearing at O_0 – O_6 when the P8 ④ is at "H" determine which segments of the digit are to be turned on to display a specific number. Also, since segments of the LED display are of "anode common", each segment comes on when the signal level at O_0 through O_6 is "L".

As an example in Fig. 46, the rightmost digit has its segments a–d and g turned on and segments e and f turned off, resulting in the number 3 being displayed. The remaining digits also have their respective segments either turned on and off according to the signal levels at O_0 through O_6, all this results in the display of 0123 on the LED counter. When the counter is actually counting, the waveform appearing at O_0 – O_6 is changing constantly.

The tape count pulse, or the pulse from the photo-coupler on the detector PC Board whose waveform is reshaped by TR56, TR53 and TR54, is supplied to the microcomputer. The pulse is then counted within the microcomputer before being sent out through terminals O_0 – O_6 as the display signal. Note that TR7 and TR8 shown in Fig. 45 (circuit diagram) are incorporated because of insufficient buffer capacity of IC8.

For time counting, 50 or 60 Hz from the commercial power source has its waveform reshaped by TR64 and then is supplied to the IRQ terminal of the microcomputer. The 50/60 Hz switching is automatically detected inside the microcomputer. This frequency is used to count time in seconds.

6-3. ATS ⟷ Syscon Control Signal

With ATS, control signals are sent out, apart from the function keys, from the ATS circuit to the SYSCON circuit. In other words, signals are delivered to the microcomputer for SYSCON from the microcomputer for ATS so as to control the action of the system control illustrated in Fig. 49.

Fig. 50 gives the control signals in use.

In addition, a control signal is also sent out from the SYSCON's microcomputer to the ATS's microcomputer. That signal, called the STOP signal, is used to forcedly stop the ATS. The system is designed such that only the stop signal can be accepted during the auto tuning operation. To cancel the auto tuning mode, the STOP key must be depressed to cause the IRQ terminal of ATS's microcomputer to go to "L" level for forced termination. Fig. 51 shows the timing chart for the IRQ terminal.

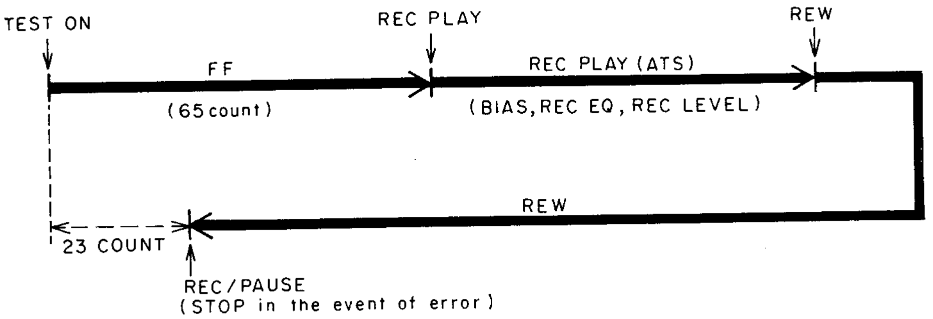
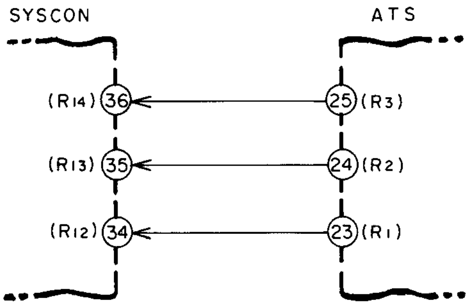


Fig. 49 Syscon Action with ATS


SYSCON
ATS
(R14) 36
25 (R3)
(R13) 35
24 (R2)
(R12) 34
23 (R1)

PORT (ATS) FUNCTION MODE	R3	R2	R1
NO OPERATION	0	0	0
REW	0	0	1
FF	0	1	0
STOP	0	1	1
REC PLAY	1	0	0
REC/PAUSE	1	1	1

(1: H Level
0: L Level)

Fig. 50 ATS → Syscon Control Signal

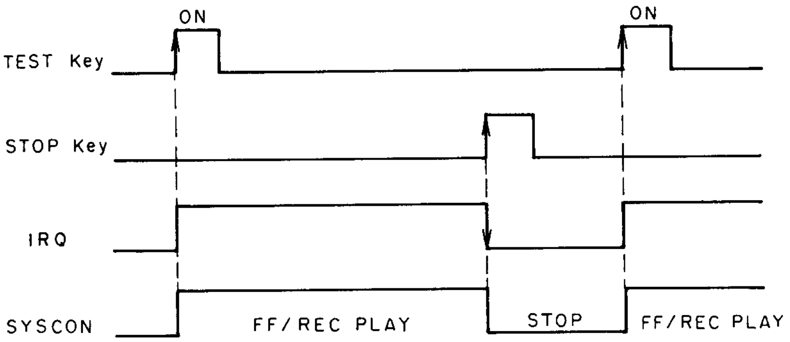
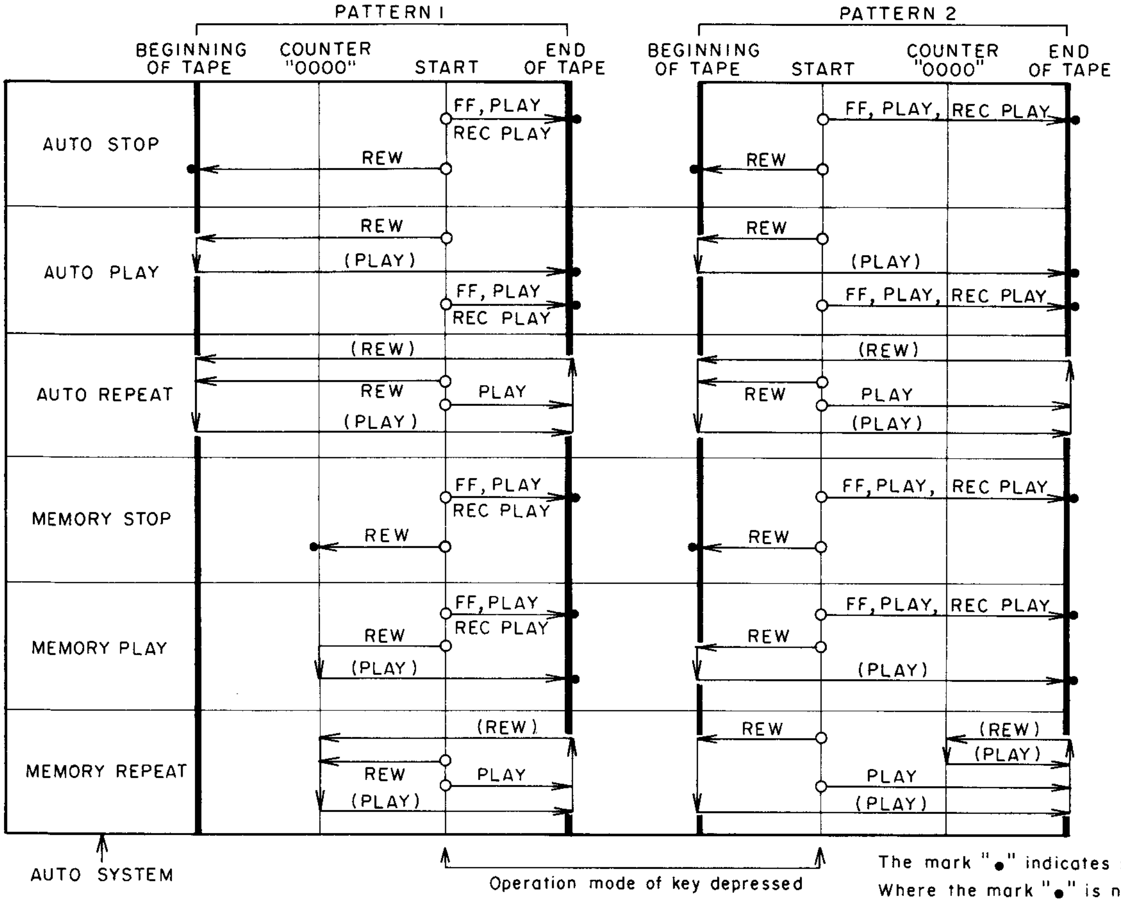

ON
ON
TEST Key
STOP Key
IRQ
SYSCON
FF/REC PLAY
STOP
FF/REC PLAY

Fig. 51 Timing Chart for IRQ Terminal


PATTERN 1
BEGINNING OF TAPE
COUNTER "0000"
START
END OF TAPE
PATTERN 2
BEGINNING OF TAPE
START
COUNTER "0000"
END OF TAPE
AUTO STOP
AUTO PLAY
AUTO REPEAT
MEMORY STOP
MEMORY PLAY
MEMORY REPEAT
FF, PLAY
REC PLAY
REW
(PLAY)
(REW)
PLAY
FF, PLAY, REC PLAY
AUTO SYSTEM
Operation mode of key depressed

The mark "●" indicates stopping.
Where the mark "●" is not shown, the loop as indicated by the mark "⟶" is repeated.

Fig. 52 Auto System Operation

6-4. Auto System Operation

With the GX-F95, the auto system switch may be used with the counter memory to provide for the auto system operation illustrated in Fig. 52.

With pattern 1, a mode key is depressed between "0000" on the counter and the end of tape, whereas with pattern 2, a mode key is depressed between the beginning of tape and "0000" on the counter.

7. FACTORY REFERENCE TAPE

Where the ATS is not made use of, the tape deck is adjusted using the factory reference tape, just as with conventional models (e.g., GX-F90).

Types of reference tape in use are:

Normal	:	Maxell	UD	C-60
CrO_2	:	TDK	SA	C-60
Metal	:	TDK	MA-C	C-60

Note that with Fe-Cr tape, there is no guarantee that the optimum condition can be attained with the use of either ATS or reference tape.

With the deck in the "reference" state, the signals from the microcomputer that control the bias, Rec EQ and Rec level are predetermined for each of normal, CrO_2 and metal tapes (each tapes being identified by cassette pack configuration). In other words, fixed resistances and condensers are connected in the ATS bias, ATS Rec EQ and ATS Rec level circuits. At the factory, the manual bias, Rec peaking (VL1) and manual Rec level are adjusted using the appropriate reference tape just as with conventional models such as GX-F90.

In addition, the height of the head, azimuth, etc. are also adjusted in the "reference" state.

8. SPECIAL COMMENTS

As mentioned in the foregoing discussion, ATS-based operations are performed with use of pulses and it is therefore necessary to use an oscilloscope in troubleshooting. Since there is no decisive method of determining if the microcomputer chip is functioning properly, waveforms appearing at various points must be checked when there is any indication of malfunction.

It is also necessary to check for +B or proper RESET action with power turned on (terminal ③ of the microcomputer goes to "L" momentarily).

If every retry with ATS fails and the error condition occurs again, check must also be made to see if the proper frequency characteristic or Rec level has been obtained with the deck placed in the "reference" state.

VII. MECHANISM ADJUSTMENT

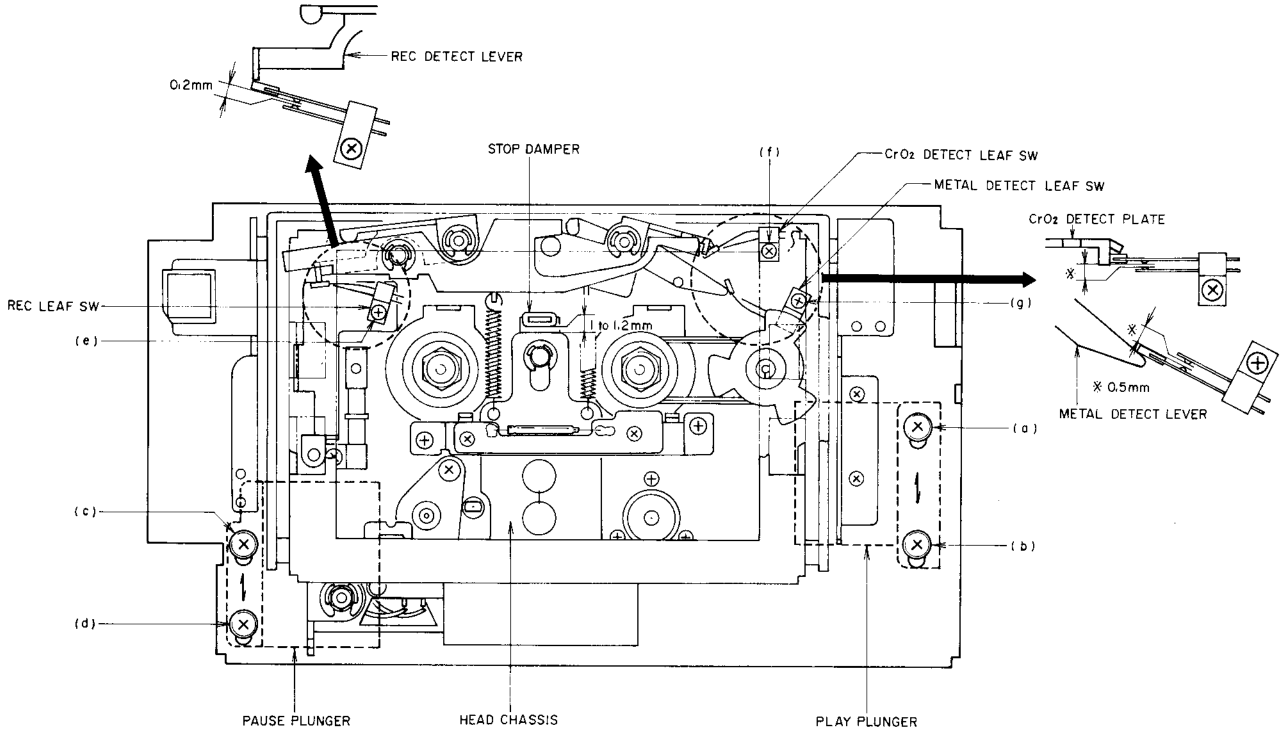


Fig. 53

1. PLAY PLUNGER INSTALLATION POSITION ADJUSTMENT (Refer to Fig. 53)

Put in PLAY mode to activate the PLAY plunger. Adjust the Position of the play plunger with the installation screws (a), (b) so that the distance between the top edge of the head chassis and the stop damper to 1.0 to 1.2 mm. After adjustment coat the installation screws with screw lock.

2. PAUSE PLUNGER INSTALLATION POSITION ADJUSTMENT (Refer to Fig. 53)

Insert a head projection gauge and confirm that in the PLAY mode the head projection is 3.3 ± 0.15 mm. (If it does not meet the specifications, refer to VIII. HEAD ADJUSTMENT). Put into the PAUSE mode from the PLAY mode and adjust the PAUSE plunger's position with installation screws (c), (d) to give a head projection of 2.4 ± 0.1 mm. After adjustment, coat the installation screws with screw lock and confirm that there is a distance of about 0.5 mm between the erase head and pad, and the pinch roller and capstan.

3. REC LEAF SWITCH INSTALLATION POSITION ADJUSTMENT (Refer to Fig. 53)

Loosen the installation screw (e) and adjust the position of the REC LEAF switch until the LEAF switch contact point gap is over 0.2 mm with the EJECT button depressed, and there is sufficient LEAF switch contact point pressure with the cassette holder set. After adjustment, insert a cassette pack with the recording defeat tabs intact to confirm there is recording and then insert a cassette pack without the recording defeat tabs and confirm that it does not record.

4. CrO_2 TAPE DETECT LEAF SWITCH INSTALLATION POSITION ADJUSTMENT (Refer to Fig. 53)

Loosen the installation screw (f) and adjust the position of the CrO_2 TAPE DETECT LEAF switch until the LEAF switch contact point gap is over 0.5 mm with the EJECT button depressed, and there is sufficient LEAF switch contact point pressure with the cassette holder set.

5. METAL TAPE DETECT LEAF SWITCH INSTALLATION POSITION ADJUSTMENT (Refer to Fig. 53)

Loosen the installation screw (g) and adjust the position of the METAL TAPE DETECT LEAF switch until the LEAF switch contact point gap is over 0.5 mm with the EJECT button depressed, and there is sufficient LEAF switch contact point pressure with the cassette holder set.

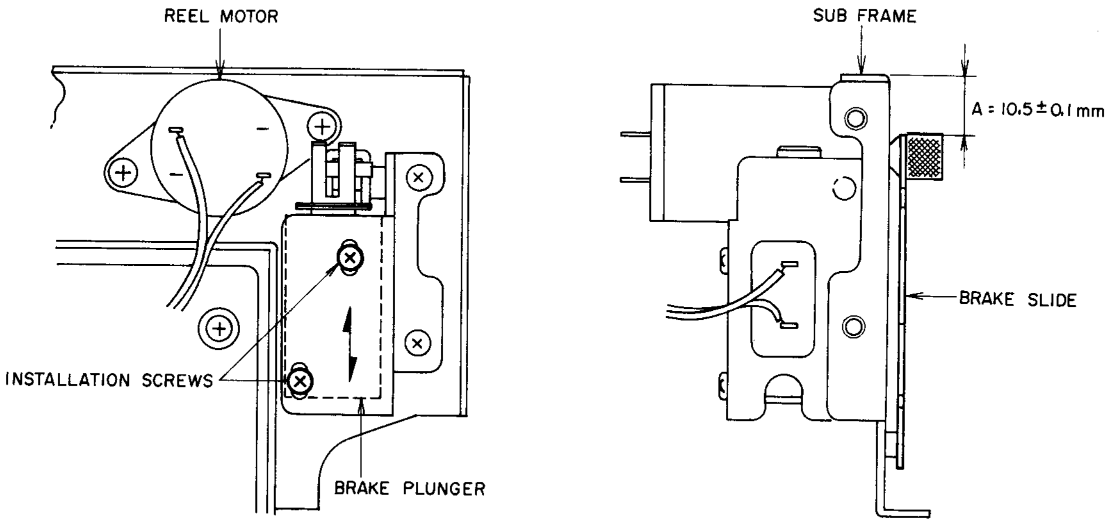

REEL MOTOR
INSTALLATION SCREWS
BRAKE PLUNGER
SUB FRAME
A = 10.5 ± 0.1 mm
BRAKE SLIDE

Fig. 54

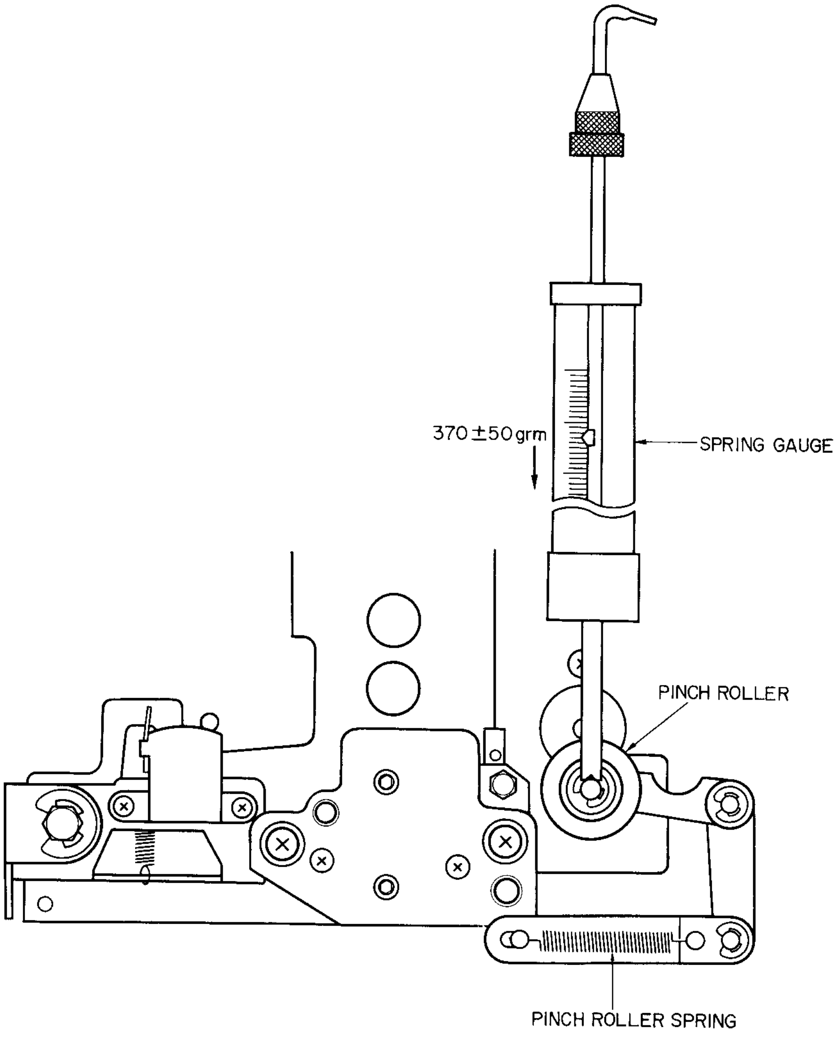

370 ± 50 grm
SPRING GAUGE
PINCH ROLLER
PINCH ROLLER SPRING

Fig. 55

6. VERIFICATION OF ACTION OF AUTO TAPE SELECTOR

Prepare a normal tape, CrO_2 tape and metal tape with a detection notch and verify that switching is automatically made to the appropriate mode for the specific tape set on the deck. Note that the tape selector switch must be set to AUTO.
If the selector malfunctions, then adjustments described in items 4 and 5 must be made once again.

7. BRAKE PLUNGER INSTALLATION POSITION ADJUSTMENT (Refer to Fig. 54)

With the brake off (for example during REW), adjust the brake plunger's position with the installation screws (a), (b) so that the distance between the tip of the brake slide and the sub frame is 10.5 ± 0.1 mm.

8. PINCH ROLLER PRESSURE MEASUREMENT (Refer to Fig. 55)

Put in PLAY mode. Push pinch roller arm down with the spring gauge, push the pinch roller 1–2 mm from the capstan and release slowly.
Read the spring gauge at the moment the pinch roller touches the capstan and begins to ratate. Specified contact pressure measurement of 380 ± 50 grm. If no measurement is obtained, replace the pinch roller spring.

9. WINDING TORQUE MEASUREMENT IN EACH MODE

Insert cassette torque meter and measure in each mode.
For fast forward and rewind measure at the end of the tape when the tape has stopped running.
The specified torque is:

Playback :	30 to 50 g-cm.
Fast Forward, Rewind :	70 to 120 g-cm.

VIII. HEAD ADJUSTMENT

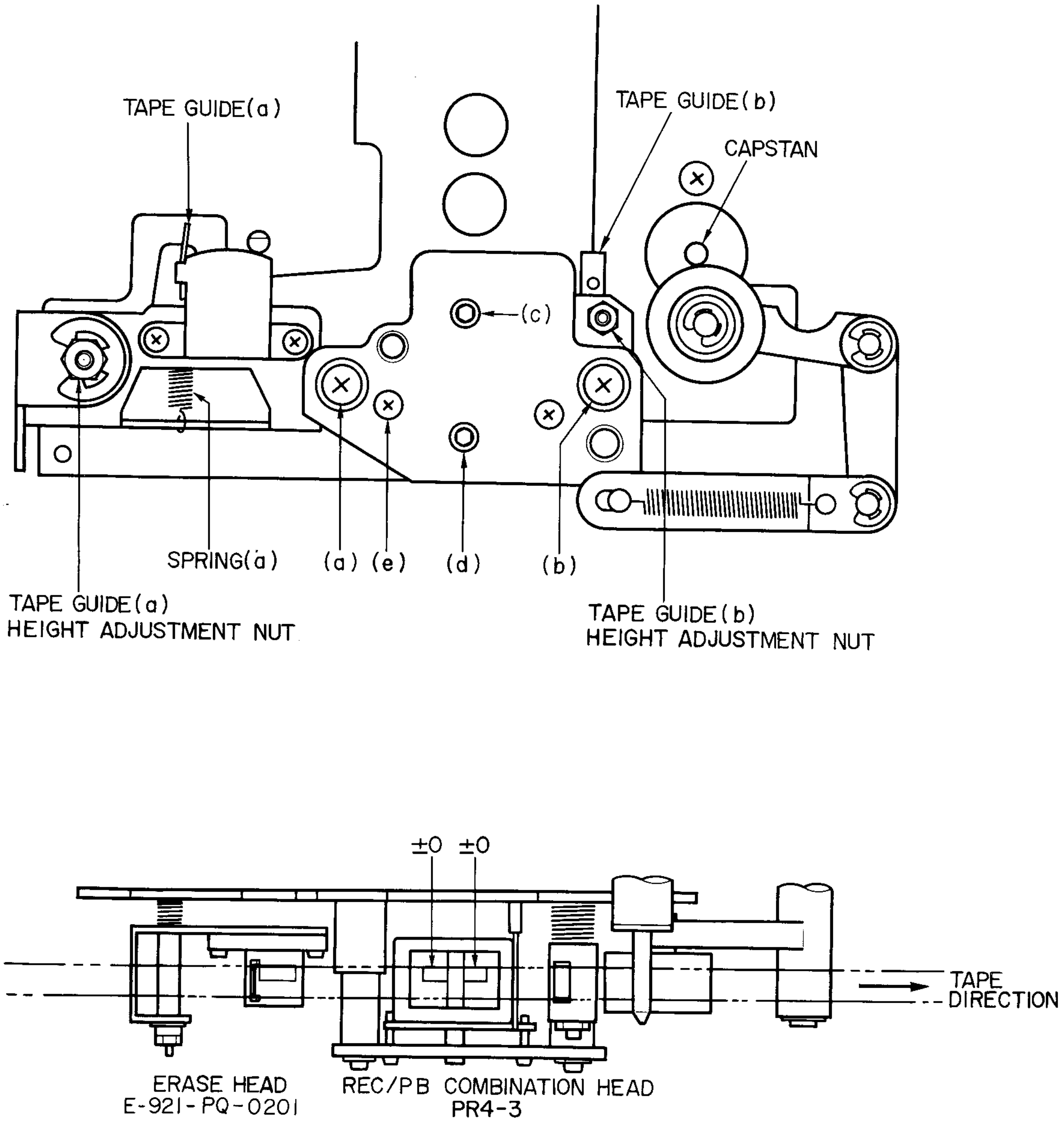

TAPE GUIDE(a)
TAPE GUIDE(b)
CAPSTAN
(c)
SPRING(a)
(a)
(e)
(d)
(b)
TAPE GUIDE(a)
HEIGHT ADJUSTMENT NUT
TAPE GUIDE(b)
HEIGHT ADJUSTMENT NUT
±0
±0
TAPE
DIRECTION
ERASE HEAD
E-921-PQ-0201
REC/PB COMBINATION HEAD
PR4-3

Fig. 56

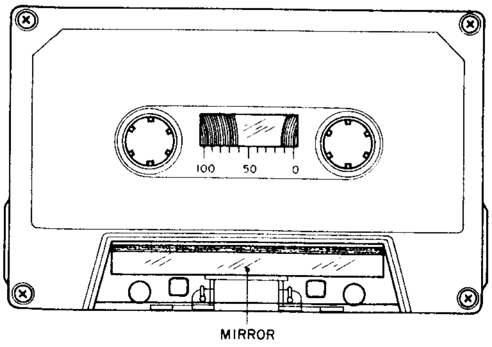

100
50
0
MIRROR

Fig. 57

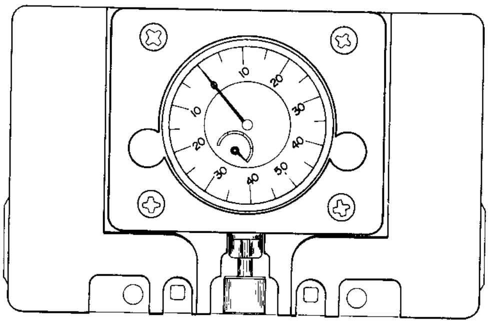

10
20
30
40
50

Fig. 58

1. TAPE GUIDE HEIGHT ADJUSTMENT (Refer to Figs. 56, 57)

1) When using an ordinary cassette, the tape guides and heads, etc. are not visible. As shown in Fig. 57 use a cassette tape from which part of the cassette case has been cut out and a mirror installed for easy visibility of the head area when making tape guide height adjustment.
2) At playback mode, adjust tape guide (a) and tape guide (b) height with tape guide height adjustment nuts so that the tape runs smoothly and does not catch on the tape guides.

2. REC/PB COMBINATION HEAD PROJECTION ADJUSTMENT (Refer to Figs. 56, 58)

Insert the AKAI Head Projection Gauge (Fig. 58) and adjust screws (a) and (b) so that it reads 3.3 ± 0.15 mm in the Playback Mode.

3. REC/PB COMBINATION HEAD HEIGHT ADJUSTMENT (Refer to Fig. 56)

1) Utilize the cassette tape used in Tape Guide Height Adjustment above, and playback the leader tape part of cassette tape.
2) As shown in Fig. 56 adjust head height with screws (c), (d) and (e) until the upper edge of the left channel REC/PB Combination head core.

4. REC/PB COMBINATION HEAD AZIMUTH ALIGNMENT ADJUSTMENT (Refer to Fig. 56)

1) The cores of recording and playback heads are mounted in a single head holder to form the recording/playback combination head otherwise known as the Super GX Head. Both recording and playback head cores move when azimuth alignment is adjusted. To obtain optimum playback head core azimuth alignment, follow the instruction 2) – 5) carefully.
2) Playback a 10 kHz azimuth alignment adjustment test tape and adjust the adjustment screw (e) until the output levels of both channels are at maximum.
3) Invert cassette and see whether there is an output level difference from the above. If there is a difference, repeat 2) and readjust.
4) Record a 10 kHz, –20 VU signal from the audio frequency oscillator.
5) Rewind and check for any fluctuation in the output level at playback.

NOTES:

1. Be sure to clean the heads prior to head adjustment.
2. Be careful not to use a magnetized driver or other magnetized tools in the vicinity of the heads.
3. Be sure to demagnetize the heads with a Head Demagnetizer before and after head adjustment.
4. When a mirror installed cassette test tape as shown in Fig. 57 is required, it can be ordered from AKAI Electric Co.
5. The position where spring (a) meets the tape guide base is adjusted at the place of manufacture and readjustment is unnecessary.

IX. ELECTRICAL ADJUSTMENT

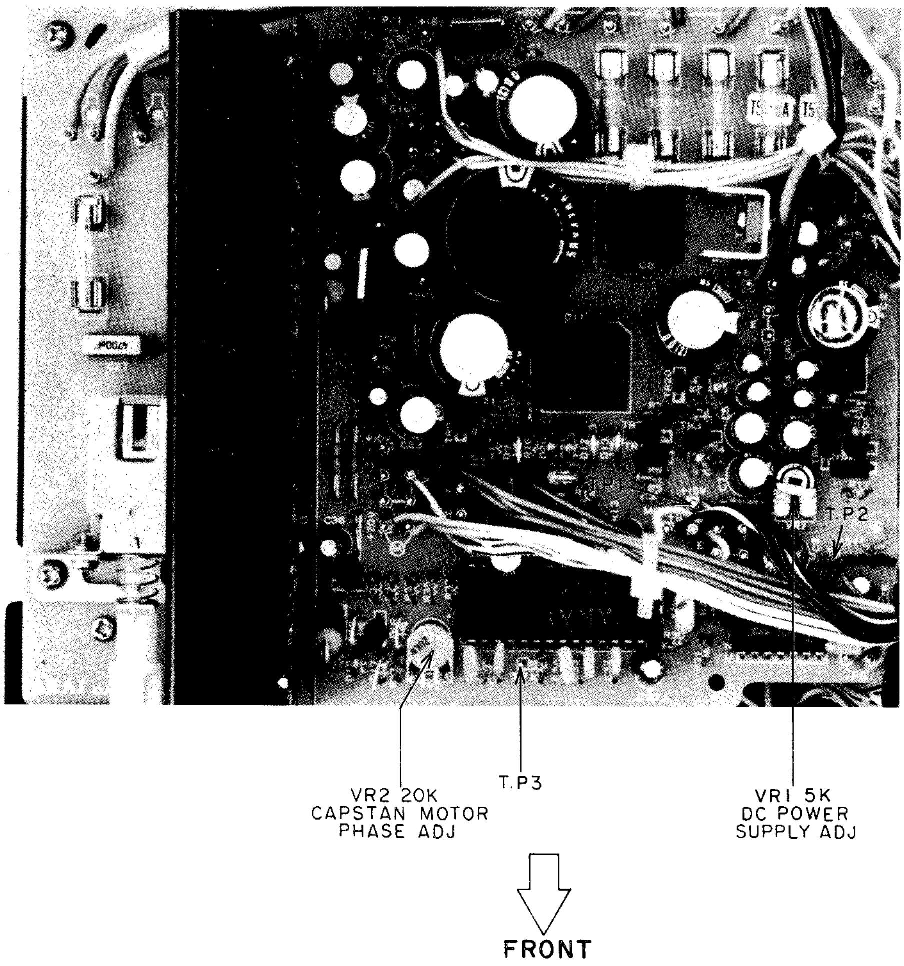

T.P1
T.P2
T.P3
VR2 20K
CAPSTAN MOTOR
PHASE ADJ
VR1 5K
DC POWER
SUPPLY ADJ
FRONT

Fig. 59 Power Supply P.C Board (CU-5213)

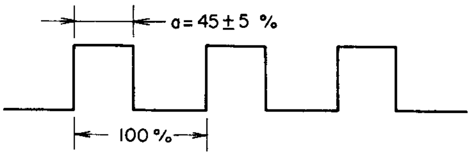


Fig. 60

1. DC VOLTAGE ADJUSTMENT (Refer to Fig. 59)

Connect a Digital Voltmeter or a DC Voltmeter between TP1 ($\cong$+15V) and GND and check the voltage. Check the voltage between TP2 ($\cong$−15V) and GND next and adjust VR1 (5 kohms) to make absolute voltage reading of it exactly equal to that of TP1. Error of the adjustment should be less than ±0.3V.

2. CAPSTAN MOTOR PHASE ADJUSTMENT (Refer to Figs. 59, 60)

Connect an Oscilloscope to TP3 and adjust VR2 (20 kohms) to get a waveform of a = 45% ± 5% as shown in Fig. 60.

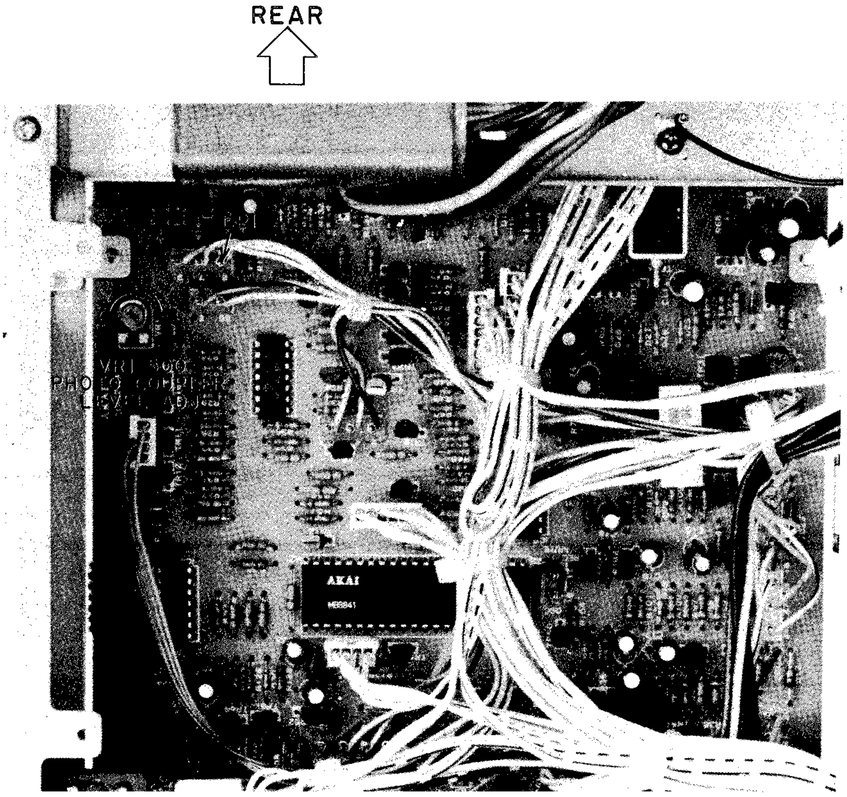

REAR
VR1 500Ω
PHONO COUPLER
LEVEL ADJ.

Fig. 61 Syscon P.C Board (CU-5214A)

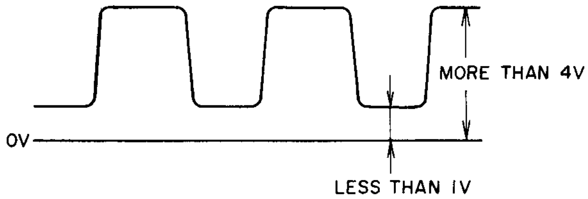

MORE THAN 4V
OV
LESS THAN IV

Fig. 62

3. PHONO COUPLER LEVEL ADJUSTMENT (Refer to Figs. 61, 62)

1) Connect an oscilloscope to TP1 and turn VR1 (500 ohms) on the Syscon P.C Board fully clockwise.
2) Remove tape from a cassette pack and prepare an empty pack.
   Set it on the equipment and turn the MODE switch to F. FWD.
3) Confirm the waveform on the Oscilloscope is as shown in Fig. 62.
4) If the High Level is not more than 4V, adjust VR1 (500 ohms) to get the High Level of 4V.

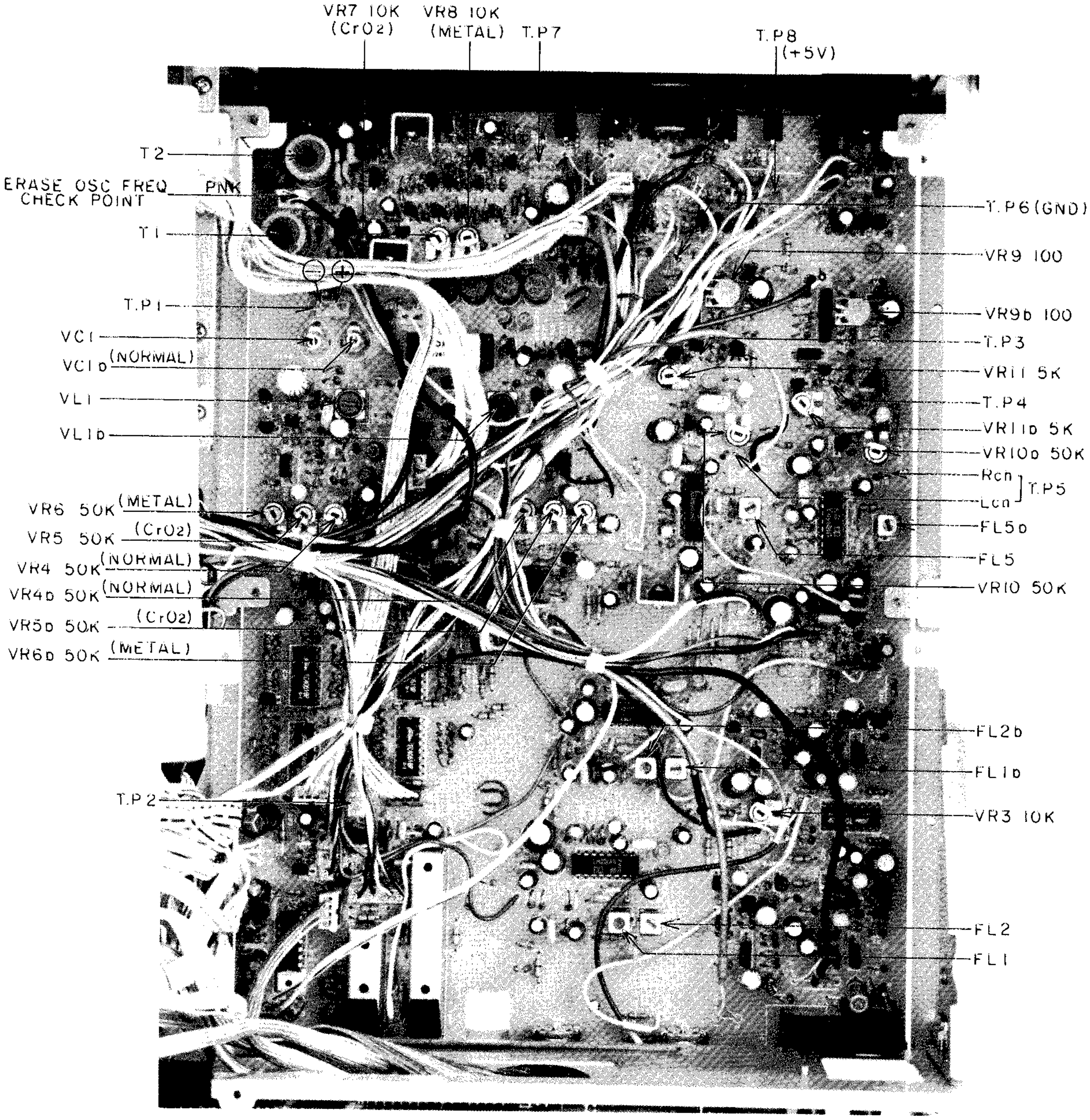

VR7 10K (CrO2)
VR8 10K (METAL)
T.P7
T.P8 (+5V)
T2
ERASE OSC FREQ CHECK POINT
PNK
T1
T.P1
VC1
VC1b (NORMAL)
VL1
VL1b
VR6 50K (METAL)
VR5 50K (CrO2)
VR4 50K (NORMAL)
VR4b 50K (NORMAL)
VR5b 50K (CrO2)
VR6b 50K (METAL)
T.P2
T.P6 (GND)
VR9 100
VR9b 100
T.P3
VR11 5K
T.P4
VR11b 5K
VR10b 50K
Rcn
Lcn
T.P5
FL5b
FL5
VR10 50K
FL2b
FL1b
VR3 10K
FL2
FL1

Fig. 63 Pre Amp P.C Board

VR9 100 :	Off-set Voltage Adj.
VR10 50K :	PB Level Adj.
VR11 5K :	PB EQ. Adj.
VL1 22 mH :	REC Peaking Adj.
T2 MC-155 :	Erasing OSC Freq. Adj.
T1 2330-046 :	Bias OSC Coil Tuning Adj.
FL5 D07-003K :	PB Amp Bias Leak Adj.
FL1 D07-003K :	REC Amp Bias Leak Adj.

VC1 55 pF (Normal)	Freq. Response Adj.
VR7 10K (CrO_2)	
VR8 10K (Metal)	
VR4 50K (Normal)	REC Level Adj.
VR5 50K (CrO_2)	
VR6 50K (Metal)	
FL2 D07-001K :	19 kHz Filter Adj.
VR3 10K :	Auto Tuning Adj.

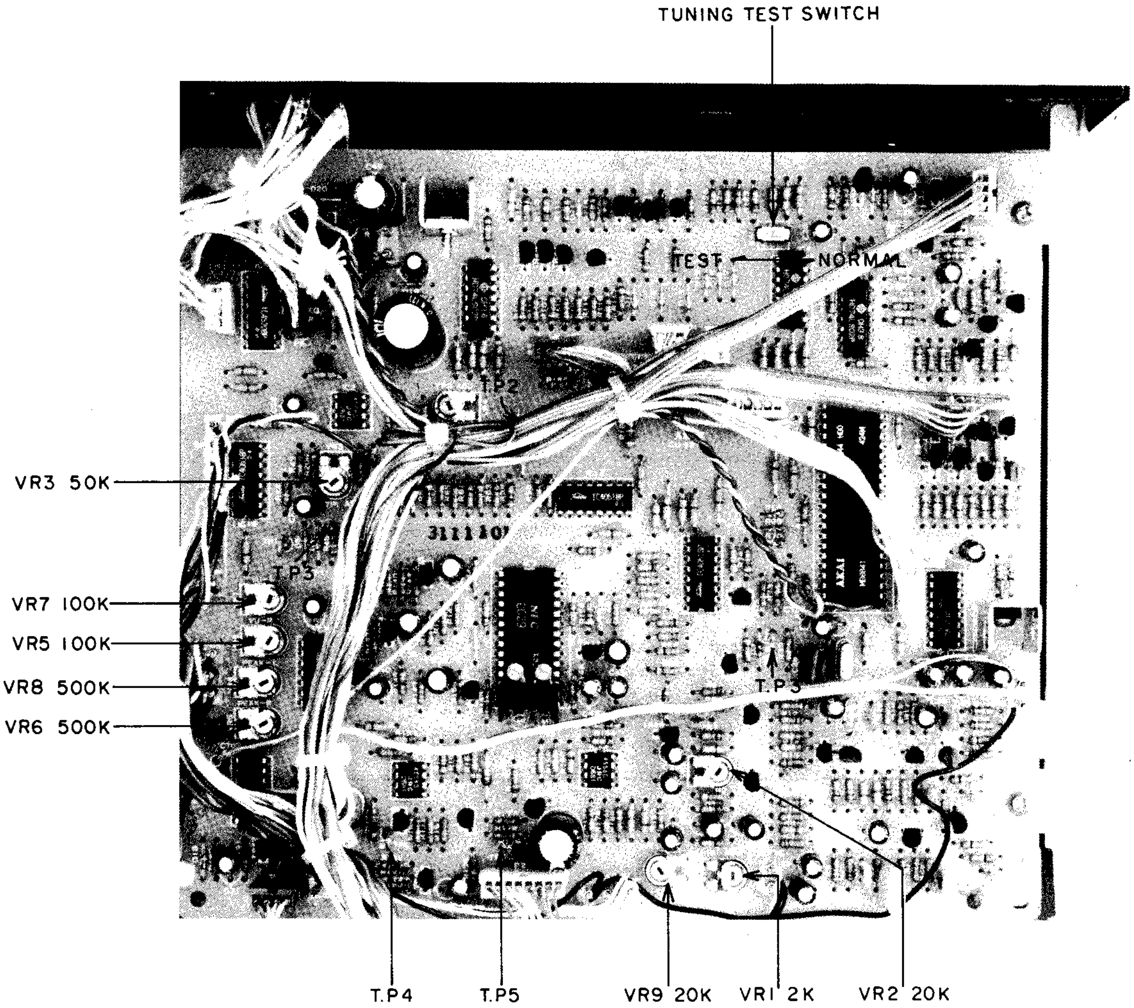

TUNING TEST SWITCH
TEST
NORMAL
T.P2
VR3 50K
T.P3
VR7 100K
VR5 100K
VR8 500K
VR6 500K
T.P3
T.P4
T.P5
VR9 20K
VR1 2K
VR2 20K

Fig. 64 Tuning P.C Board

VR7 100K : Lch DC Voltage Adj.
VR5 100K : Rch DC Voltage Adj.
VR9 20K : Bar Meter Sens. Adj.
VR8 500K : Lch Peak Mode Sens. Adj.
VR6 500K : Rch Peak Mode Sens. Adj.
VR1 2K : Rch 1 kHz Filter Level Adj.
VR2 20K : 10 kHz Filter Level Adj.
VR3 50K : A-D Conversion Voltage Adj.
VR4 100K : A-D Conversion Voltage Adj.

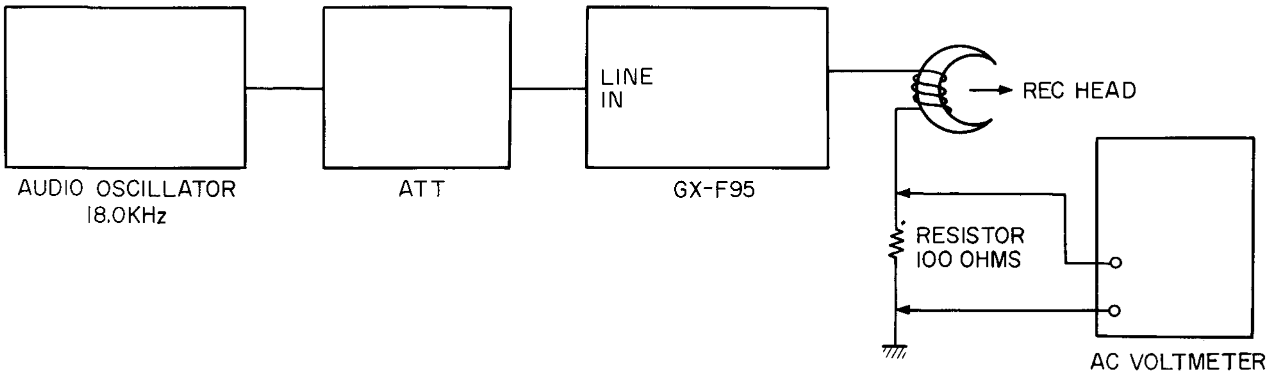

AUDIO OSCILLATOR
18.0KHz
ATT
LINE
IN
GX-F95
REC HEAD
RESISTOR
100 OHMS
AC VOLTMETER

Fig. 65 Instruments Connection

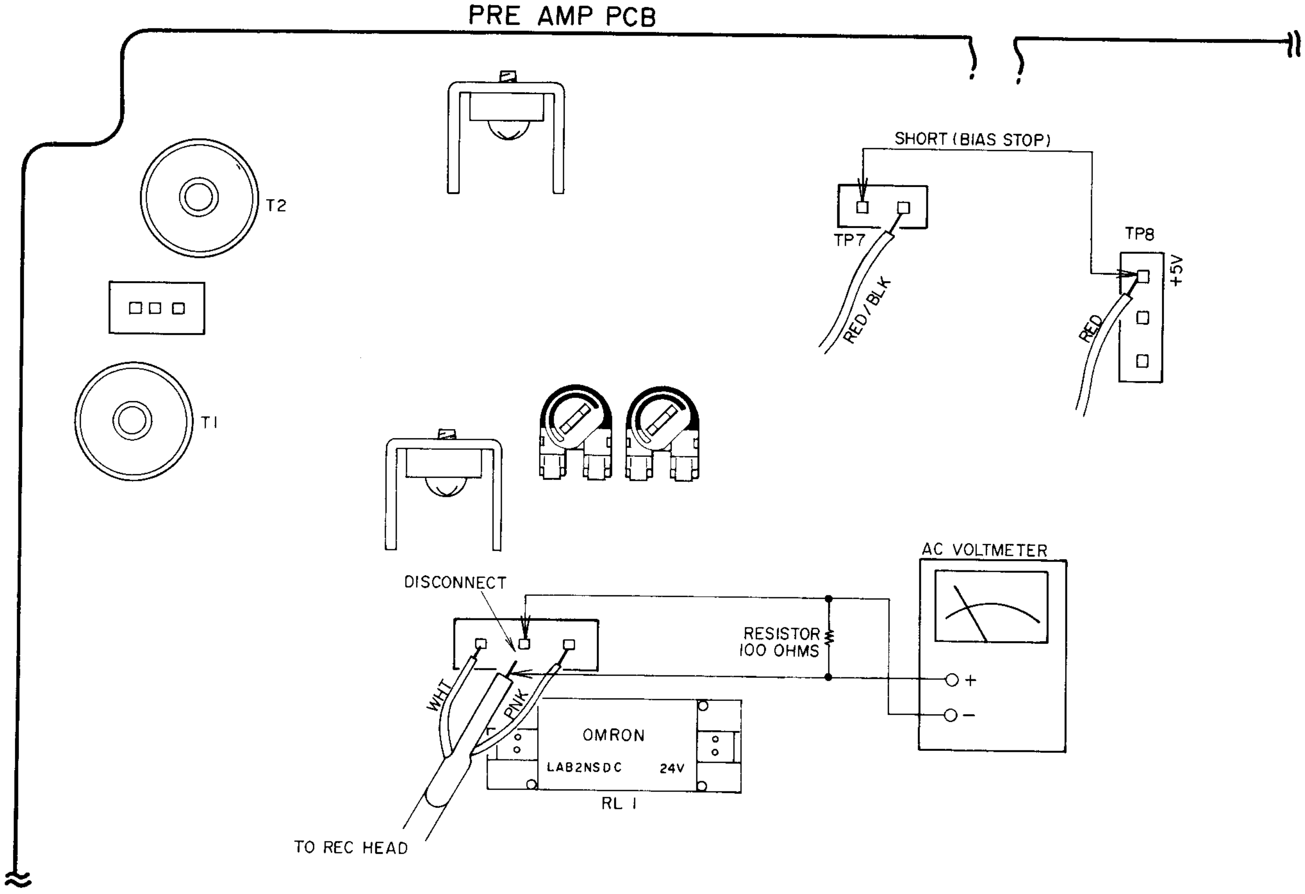

PRE AMP PCB
T2
T1
SHORT (BIAS STOP)
TP7
RED/BLK
TP8
+5V
RED
AC VOLTMETER
DISCONNECT
RESISTOR
100 OHMS
WHT
PNK
OMRON
LAB2NSDC
24V
RL 1
+
−
TO REC HEAD

Fig. 66 Rec Peaking Adjustment

4. PRE AMPLIFIER ADJUSTMENT (Refer to Figs. 63, 65, 66)

Step	Adjustment Item	Test Tape Supply Signal	Mode	Adjustment Point	Result	Remarks
1	Off-set Voltage Adjustment	No Signal Input	STOP	VR9 100	0V ± 0.5V	Connect a Digital Voltmeter between TP3 (Lch) and TP4 (Rch).
2	Playback Level Adjustment	333 Hz 0 VU Test Tape	PLAY	VR10 50K	−5.5 dBm ± 0.2 dBm (410 mV)	
3	Playback Equalizer Adjustment	10 kHz Test Tape	PLAY	VR11 5K	−19.0 dBm ±0.5 dBm	
4	Rec Peaking Adjustment	18.0 kHz from Oscillator	REC	VL1 22 mH	Maximum AC Voltmeter indication	Refer to NOTE 6, 7, 10 and Figs. 65, 66.
5	Erasing Oscillation Circuit Adjustment	No Signal Input	REC	T2 MC-155	100 kHz ± 2 kHz	Cramp hook up wire of the Erasing Head with a clip over its vinyl insulation and check the frequency by a Frequency Counter. Metal Position.
6	Bias Oscillation Coil Tuning Point Adjustment	No Signal Input	REC	T1 2330-046	Check the voltage by Connection a Tester (2.5V range) to TP1. Turn T1 to adjust the voltage to its dipping point. Metal Position.	
7	Playback Amp Bias Leak Adjustment	No Signal Input	REC	FL5 D07-003K (YLW)	Minimum Output	Set the Monitor Switch to TAPE. Mic, Line Volume at Maximum. Metal Position.
8	Recording Amp Bias Leak Adjustment	No Signal Input	REC	FL1 D07-003K (YLW)	Minimum Output	Set the Monitor Switch to SOURCE Mic, Line Volume at Maximum. Metal Position.
9	Normal Position Frequency Response Adjustment	LH Blank Tape 1,000 Hz, 10,000 Hz −25.5 dBm recording	REC/ PLAY	VC1 5 to 55 pF	1,000 Hz to 10,000 Hz flat response	Set the Tape Selector Switch to AUTO.
10	CrO_2 Position Frequency Response Adjustment	CrO_2 Blank Tape 1,000 Hz, 10,000 Hz −25.5 dBm recording	REC/ PLAY	VR7 10K	1,000 Hz to 10,000 Hz flat response	
11	Metal Position Frequency Response Adjustment	Metal Blank Tape 1,000 Hz, 10,000 Hz −25.5 dBm recording	REC/ PLAY	VR8 10K	1,000 Hz to 10,000 Hz flat response	Set the Tape Selector Switch to MANUAL (Metal)

Step	Adjustment Item	Test Tape Supply Signal	Mode	Adjustment Point	Result	Remarks
12	Recording Level Adjustment	1,000 Hz –5.5 dBm recording	REC/ PLAY	Normal VR4 50K CrO_2 VR5 50K Metal VR6 50K	–5.5 dBm ±0.2 dBm (410 mV)	
13	Distortion Factor Confirmation	1,000 Hz –5.5 dBm Recording	REC/ PLAY	Normal: Less than 0.7% CrO_2 : Less than 0.6% Metal : Less than 0.6%		Refer to NOTE 8.
14	19 kHz Filter Adjustment	19 kHz from an Oscillator	REC	FL2 D07-001K	Minimum AC Voltmeter indication	MPX Filter to ON. Refer to NOTES 9, 10.

NOTES:

1. Output Level Control should be at maximum.
2. Because each of these adjustments are vital to perfect Dolby NR circuit operation, be sure that they are carried out with as little error as possible.
3. Set Auto Tuning Mode Selector to REFERENCE Mode.
4. Except for Step 14, set MPX Filter Switch to OFF Position.
5. Use the following cassette measuring tapes:
   Normal Tape : Maxell UD C-60
   CrO_2 Tape : TDK SA C-60
   Metal Tape : TDK MA-C C-60
6. Stop the recording bias oscillator while making record peaking adjustment (Refer to Figs. 65, 66).
7. As the same earth line is used for both the Lch and Rch, adjust the Lch with the Rch lead wire (PNK) detached and the Rch with the Lch (WHT) lead wire detached.
8. If it does not comply with the specifications, repeat Steps 8 to 11 and readjust.
9. Adjust the oscillator's frequency to give a frequency counter reading of 19.00 kHz.
10. Unless the core is moved unintentionally this adjustment is not necessary.

5. BAR METER ADJUSTMENT (Refer to Figs. 64, 67)

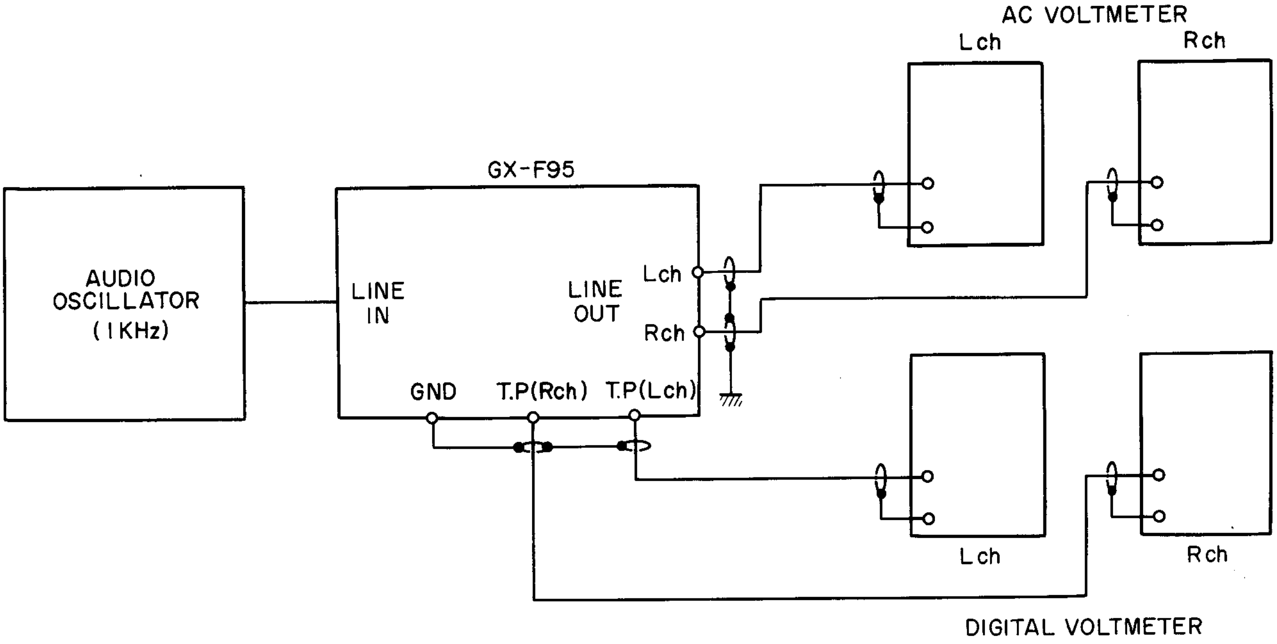

AC VOLTMETER
Lch
Rch
GX-F95
AUDIO OSCILLATOR (1 KHz)
LINE IN
LINE OUT
Lch
Rch
GND
T.P(Rch)
T.P(Lch)
Lch
Rch
DIGITAL VOLTMETER

Fig. 67 Instrument Connection

Step	Adjustment Item	Supply Signal	Adjustment Point	Result	Remarks
1	Input Level Setting	1 kHz from an oscillator	LINE REC Volume	−5.5 dBm (410 mV) (LINE OUT)	
2	VU Mode DC Voltage Adjustment	1 kHz from an oscillator	VR7 100K (Lch) VR5 100K (Rch) (Tuning PCB)	1.52V ± 0.05V (TP Output)	Set the PEAK/VU button to VU. Connect a Digital Voltmeter between TP4 (Lch) and TP5 (Rch).
3	Bar Meter Sensitivity Adjustment	1 kHz from an oscillator	VR9 20K (Tuning PCB)	0 dB indication (Bar Meter)	Turn off the segment of 0 dB once and adjust it to the position where it completely lights.
4	Peak Mode Sensitivity Adjustment	1 kHz from an oscillator	VR8 500K (Lch) VR6 500K (Rch) (Tuning PCB)	−7 dB indication (Bar Meter)	Set the PEAK/VU button to PEAK. Turn off the segment of −7 dB once and adjust it to the position where it completely lights.

NOTES: 1. Adjust when 3 secs have elapsed after the power is switched ON.
2. Put the monitor switch to SOURCE and the output volume to Maximum.

6. AUTO TUNING ADJUSTMENT
(Refer to Figs. 63, 64)

1) Set the Tuning Test Switch of the Tuning P.C Board to TEST.
2) Connect TP2 (Mute release point) of the Pre Amp P.C Board to GND to release muting.
3) Set the square output of the Audio Oscillator to 1 kHz ± 2 Hz, 4 Vp-p and apply it to TP3 of the Tuning P.C Board.
4) With this condition adjust VR1 (2 kohms) of the Tuning P.C Board to get an output of Rch Line Out of −25.5 dBm (41 mV) ± 0.2 dBm.
5) Then adjust VR3 (10 kohms) of Pre Amp P.C Board to get the output of Lch Line Out of −25.5 dBm (41 mV) ± 0.2 dBm.
6) Set the Square Wave output of the Audio oscillator to 10 kHz ± 50 Hz, 4 Vp-p.
7) Adjust VR2 (20 kohms) of the Tuning P.C Board to get a Line Out output levels of −25.5 dBm (41 mV) ± 0.2 dBm for both of Lch and Rch.
   If these output levels cannot be adjusted to the specified value, restart adjustment from step 3).
8) Set Square Wave Output of Audio Oscillator to 6.3 kHz ± 100 Hz, 4 Vp-p and confirm the Line Out output levels of both of Lch and Rch are at −24.5 dBm (46 mV) ± 0.2 dBm.
9) Turn Monitor Switch to TAPE, set Sine Wave Output of the Audio Oscillator to 1 kHz ± 2 Hz and apply it to TP5 of the Pre Amp P.C Board. GND terminal of the Audio Oscillator has to be connected to TP6.
   (Should output signal not be available at any stage of the following adjustment, turn off the power source once to get the Microcomputer to the Reset state and restart the adjustments.)
10) Adjust output level of the Audio Oscillator to get Line Out Output of −25.0 dBm (41 mV) ± 0.2 dBm.
11) Connect a Digital Voltmeter to TP1 of the Tuning P.C Board and adjust VR3 (50 kohms) of the Tuning P.C Board to get a voltage of 180 mV ± 5 mV.
    GND of the Digital Voltmeter is to be connected as close to TP1 as possible.
12) Disconnect the Mute Release Wiring connected at step 2 and turn the Tuning Test Switch to NORMAL.
13) Connect a Digital Voltmeter to TP2 of the Tuning P.C Board and adjust VR4 (100 kohms) of the Tuning P.C Board to get a voltage of 180 mV ± 5 mV.

NOTES:

1. Output Level Control should be at maximum.
2. Set Dolby NR Switch to OFF Position.
3. Use an accurate Audio Oscillator of which oscillation frequency will not change during adjustments.

X. DC RESISTANCE OF VARIOUS COILS

Parts	Designation	DC Resistance
Recording/Playback Head	PR4-3	Playback: 250 ohms ± 10% Recording: 22.5 ohms
Erase Head	E-921-PQ-0201	1.6 ohms ± 20%
Play Plunger Solenoid	1240PHT1	100 ohms ± 10%
Pause Plunger Solenoid	1037THT1	100 ohms ± 10%
Brake Plunger Solenoid	0730PHT7	150 ohms ± 10%
Relay	LAB2NS DC24V	1750 ohms ± 10%

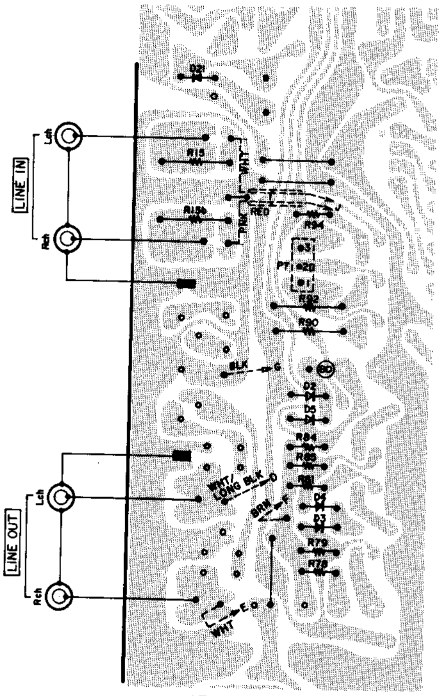
XI. CLASSIFICATION OF VARIOUS P.C BOARDS

1. P.C BOARD TITLE AND IDENTIFICATION NUMBERS

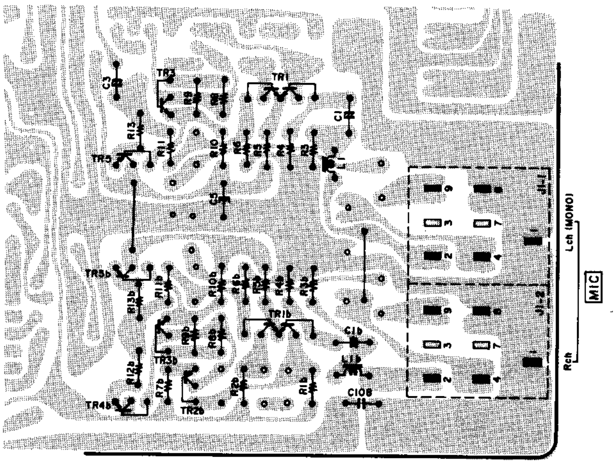
P.C Board Title	P.C Board Number
Pre Amp P.C Board	CU-5212A
Head Phone Jack P.C Board	CU-5212B
Power Supply P.C Board	CU-5213
Syscon P.C Board	CU-5214A
Remote Control P.C Board	CU-5214B
Tuning P.C Board	CU-5215
Bar Meter P.C Board	CU-5216
Counter P.C Board	CU-5217
Door Switch P.C Board	CU-3228
Motor P.C Board	CU-7007
Detector P.C Board	UCF-1520
Integrated P.C Board	CU-5219

2. COMPOSITION OF VARIOUS P.C BOARDS

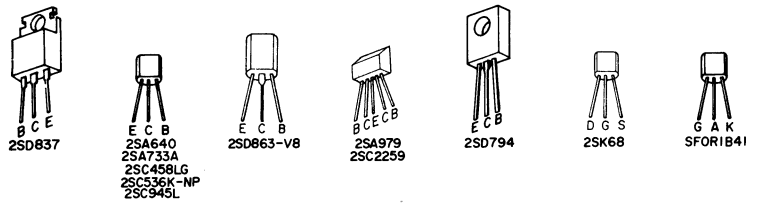
1) PRE AMP P.C BOARD CU-5212A (2ED) and HEAD PHONE P.C BOARD CU-5212B


LINE IN
Lch
Rch
D21
R15
R15b
WHT
PRK
RED
R94
P7
3
2
1
R92
R90
BLK
G
D2
D5
R84
R85
R81
D4
D3
R79
R78
WHT/
LONG BLK
D
BRN
F
WHT
E
LINE OUT
Lch
Rch

JPN, AAL MODELS


C3
TR3
R9
R8
TR1
C1
R13
TR5
R11
R10
R6
R5
R4
R3
L1
C5
J1-1
9
3
2
8
7
4
1
Lch (MONO)
MIC
Rch
J1-2
TR3b
R13b
R11b
R10b
R6b
R5b
R4b
R3b
TR1b
R9b
R8b
C1b
L1b
R12b
R7b
TR3b
R2b
R1b
C108
TR4b
TR2b

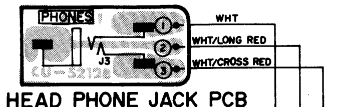
JPN, AAL MODELS


B C E
2SD837
E C B
2SA640
2SA733A
2SC458LG
2SC536K-NP
2SC945L
E C B
2SD863-V8
B C E C B
2SA979
2SC2259
E C B
2SD794
D G S
2SK68
G A K
SFOR1B41

※ REFERENCE REC MODE

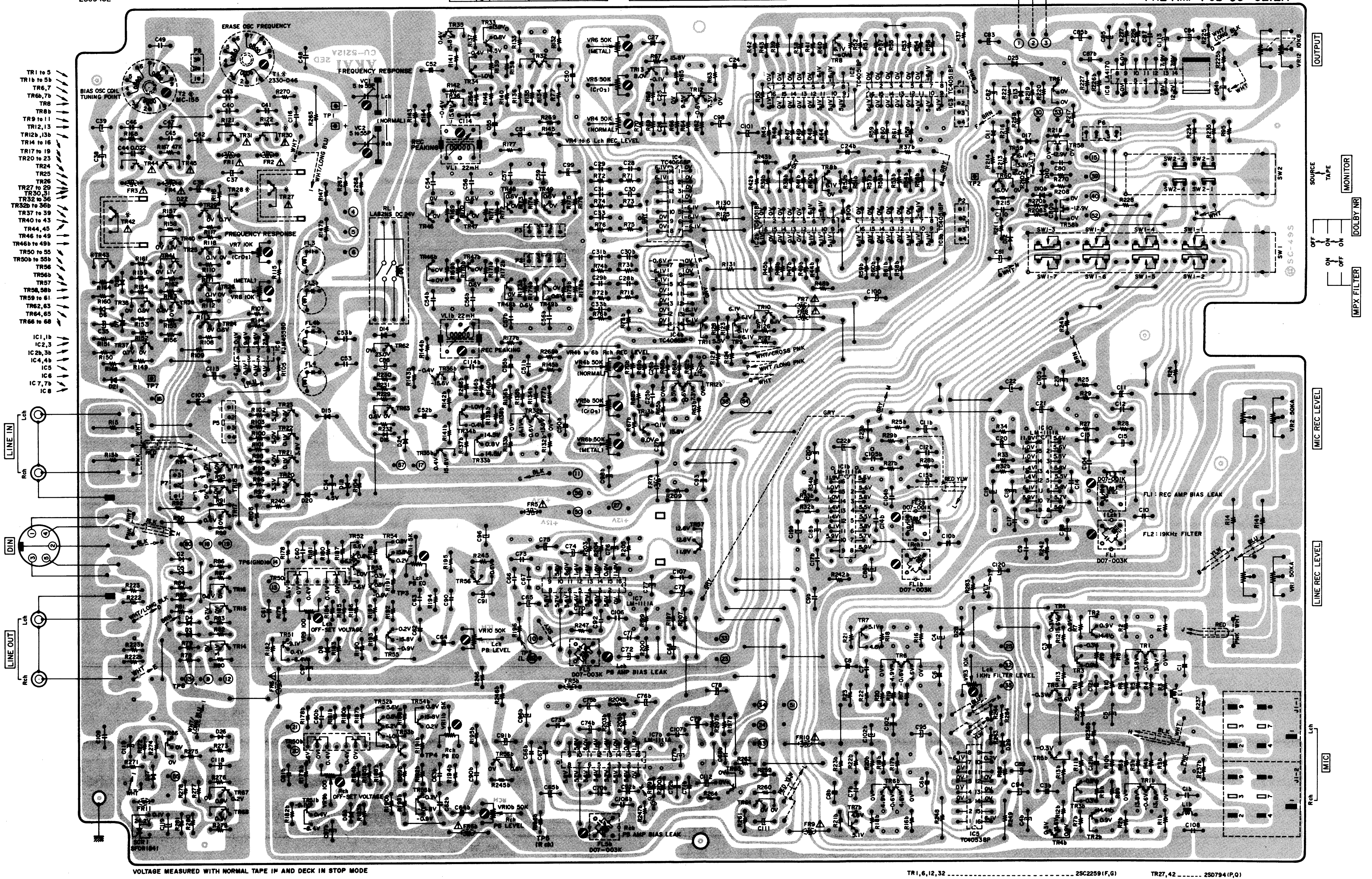
		NORMAL	CrO2	METAL
TR28	B	7.7V	9.8V	14.8V
	C	23.0V	23.0V	23.0V
	E	7.1V	9.2V	14.2V
TR27	E	6.4V	8.6V	13.6V
TR30,31	B	0.2V	0V	-0.2V
	C	6.4V	8.5V	13.5V
	E	0.1V	0.1V	0.2V
T1	⑨	64.7V AC	92.0V AC	135.8V AC
	⑧	18.0V AC	26.1V AC	38.5V AC

		NORMAL	CrO2	METAL
TR43	B	9.2V	12.8V	17.8V
	C	23.0V	23.0V	23.0V
	E	8.7V	12.2V	17.2V
TR42	E	8.1V	11.6V	16.6V
TR44,45	B	0.6V	0.7V	0.7V
	C	8.1V	11.6V	16.6V
	E	0.2V	0.3V	0.4V
T2	⑨	14.7V AC	21.4V AC	35.0V AC
	⑧	13.7V AC	18.5V AC	30.0V AC


PHONES
CU-5212B
J3
WHT
WHT/LONG RED
WHT/CROSS RED
①
②
③

HEAD PHONE JACK PCB
CU-5212B

PRE AMP PCB CU-5212A


ERASE OSC FREQUENCY
BIAS OSC COIL TUNING POINT
FREQUENCY RESPONSE
REC PEAKING
FREQUENCY RESPONSE
VR6 50K (METAL)
VR5 50K (CrO2)
VR4 50K (NORMAL)
VR4 to 6 Lch REC LEVEL
VR4b to 6b Rch REC LEVEL
RL1 LA82N5 DC24V
OFF-SET VOLTAGE
VR10 50K Lch PB LEVEL
VR10b 50K Rch PB LEVEL
PB AMP BIAS LEAK
VR3 10K 19KHz FILTER LEVEL
FL1: REC AMP BIAS LEAK
FL2: 19KHz FILTER
LINE IN
LINE OUT
DIN
MIC
OUTPUT
MONITOR
SOURCE
TAPE
DOLBY NR
MPX FILTER
MIC REC LEVEL
LINE REC LEVEL
VR2 50KA
VR1 50KA
VR12 10KB
SW1
SW2
Lch
Rch

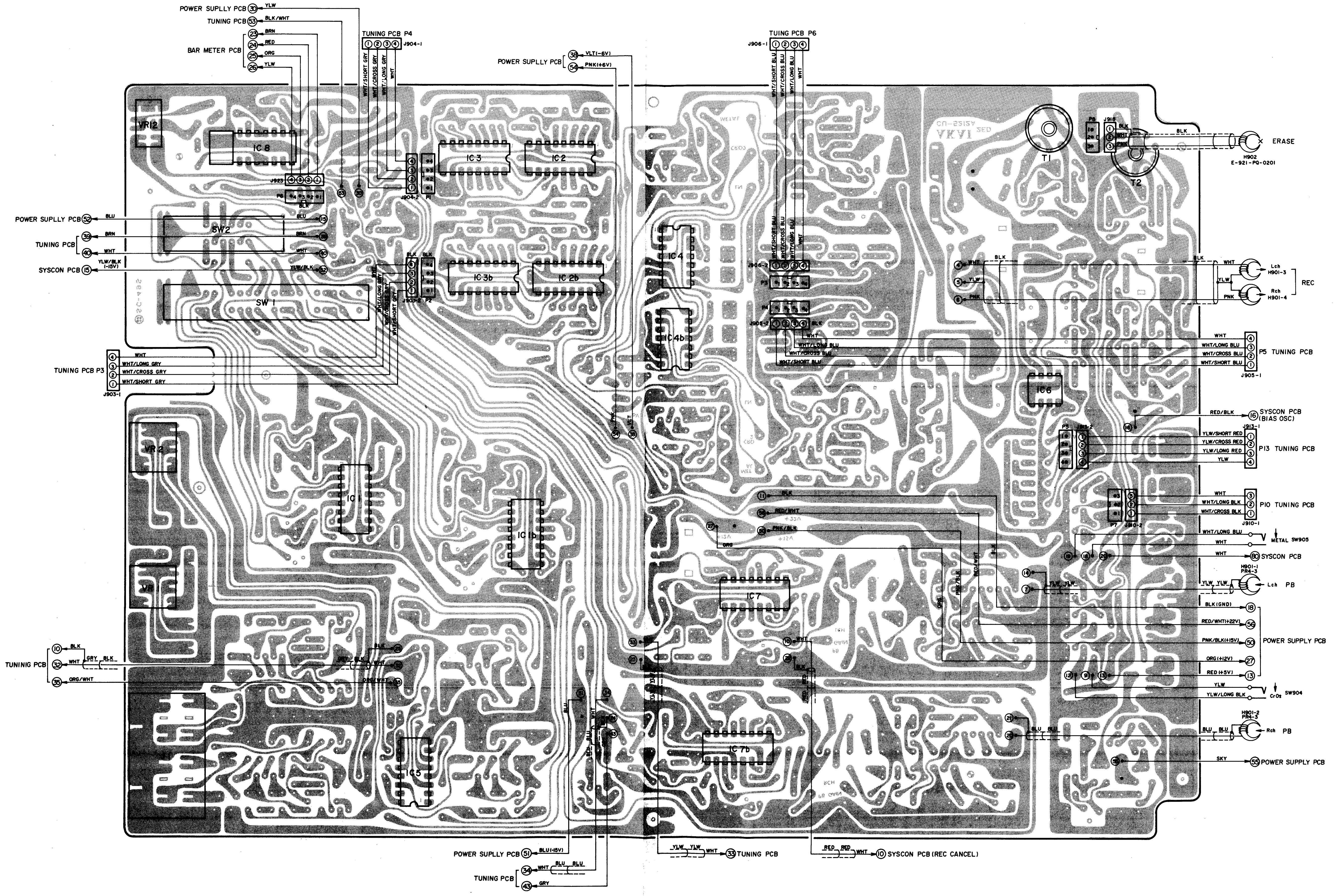
VOLTAGE MEASURED WITH NORMAL TAPE IN AND DECK IN STOP MODE

TR1,6,12,32 ---------- 2SC2259(F,G)
TR2,7,13,33 ---------- 2SA640(E,F)
TR3,34,51,53 ---------- 2SC458LG(C,D)
TR4,35,46 to 49,54,56,64,65 ---------- 2SC945L(PA,QA)
TR5,9 to 11,20 to 23,36,55,59 ---------- 2SA733A(P,Q)
TR8,14 to 19,24 to 26,28,29,37 to 41,43,60 to 63,66 to 68 --- 2SC536K-NP(E,F)

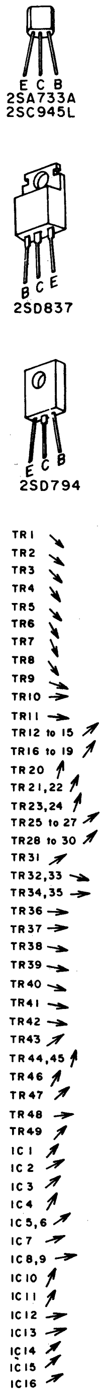
TR27,42 ------ 2SD794(P,Q)
TR30,31,44,45 --- 2SD863-V8(F)
TR50 -------- 2SK150(GR)
TR52 -------- 2SA979(F,G)
TR58 -------- 2SK68(M,N)
TR57 -------- 2SD837(P,Q)

WARNING: ⚠INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS

AVERTISSEMENT: ⚠IL INDIQU LES COMPOSANTS CRITIQUES DE SÛRETÉ. POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACER LES CONPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT


POWER SUPLLY PCB ㉚ YLW
TUNING PCB (53) BLK/WHT
BAR METER PCB ㉓ BRN ㉔ RED ㉕ ORG ㉖ YLW
TUNING PCB P4
J904-1
WHT/SHORT GRY
WHT/CROSS GRY
WHT/LONG GRY
WHT
VR12
IC 8
J923
P6
BLK
J904-2
P1
IC 3
IC 2
POWER SUPLLY PCB (52) BLU
TUNING PCB ㊴ BRN ㊵ WHT
SYSCON PCB ⑮ YLW/BLK (-15V)
SW2
SW 1
J903-2
P2
IC 3b
IC 2b
TUNING PCB P3
J903-1
WHT
WHT/LONG GRY
WHT/CROSS GRY
WHT/SHORT GRY
POWER SUPLLY PCB ㊳ VLT(-6V) (54) PNK(+6V)
TUING PCB P6
J906-1
WHT/SHORT BLU
WHT/CROSS BLU
WHT/LONG BLU
WHT
J906-2
P3
P4
J905-2
IC 4
IC 4b
T1
T2
P8
J918
BLK
WHT
PNK
ERASE
H902
E-921-PQ-0201
Lch H901-3
Rch H901-4
REC
P5 TUNING PCB
J905-1
WHT/LONG BLU
WHT/CROSS BLU
WHT/SHORT BLU
IC6
RED/BLK
SYSCON PCB (BIAS OSC)
J913-2
J913-1
P13 TUNING PCB
YLW/SHORT RED
YLW/CROSS RED
YLW/LONG RED
YLW
P7
J910-2
J910-1
P10 TUNING PCB
WHT/LONG BLK
WHT/CROSS BLK
WHT/LONG BLU
METAL SW905
SYSCON PCB (80)
H901-1
PR4-3
Lch PB
BLK(GND) ⑱
RED/WHT(+22V) (56)
PNK/BLK(+15V) (50)
ORG(+12V) ㉗
RED(+5V) ⑬
POWER SUPPLY PCB
YLW/LONG BLK
CrO2 SW904
H901-2
PR4-3
Rch PB
SKY
POWER SUPPLY PCB (55)
IC 1
IC 1b
IC 7
IC 7b
IC 5
VR 2
VR 1
TUNINIG PCB ⑩ BLK ㉜ WHT ㉟ ORG/WHT
GRY
POWER SUPLLY PCB (51) BLU(-15V)
TUNING PCB ㉞ WHT BLU ㊸ GRY
YLW YLW WHT ㉝ TUNING PCB
RED RED WHT ⑩ SYSCON PCB (REC CANCEL)
AKAI
CU-2212A
RED/WHT
PNK/BLK
ORG

2) TUNING P.C BOARD CU-5215 (2ED)


E C B
2SA733A
2SC945L
B C E
2SD837
E C B
2SD794
TR1
TR2
TR3
TR4
TR5
TR6
TR7
TR8
TR9
TR10
TR11
TR12 to 15
TR16 to 19
TR20
TR21,22
TR23,24
TR25 to 27
TR28 to 30
TR31
TR32,33
TR34,35
TR36
TR37
TR38
TR39
TR40
TR41
TR42
TR43
TR44,45
TR46
TR47
TR48
TR49
IC1
IC2
IC3
IC4
IC5,6
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IC8,9
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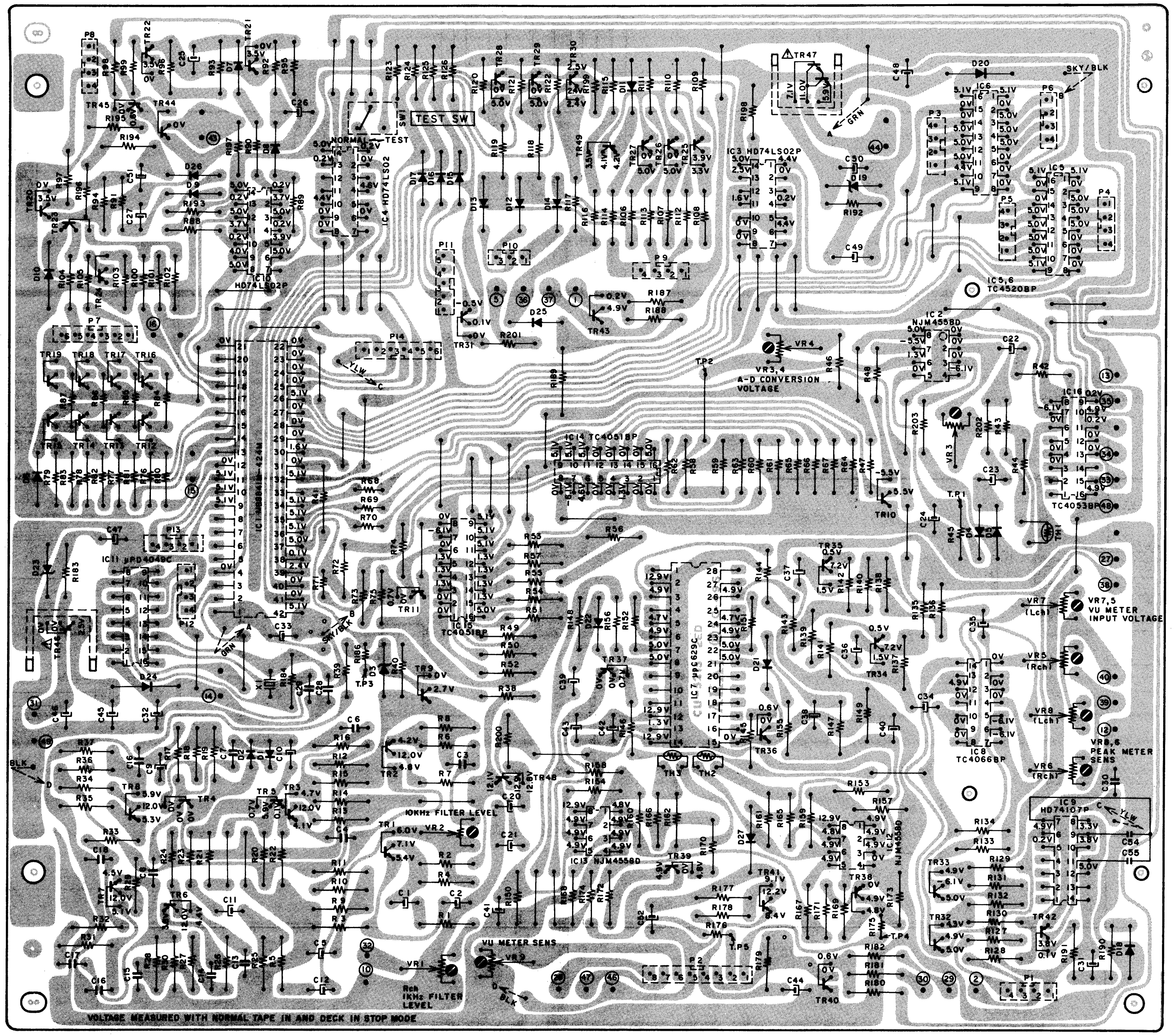
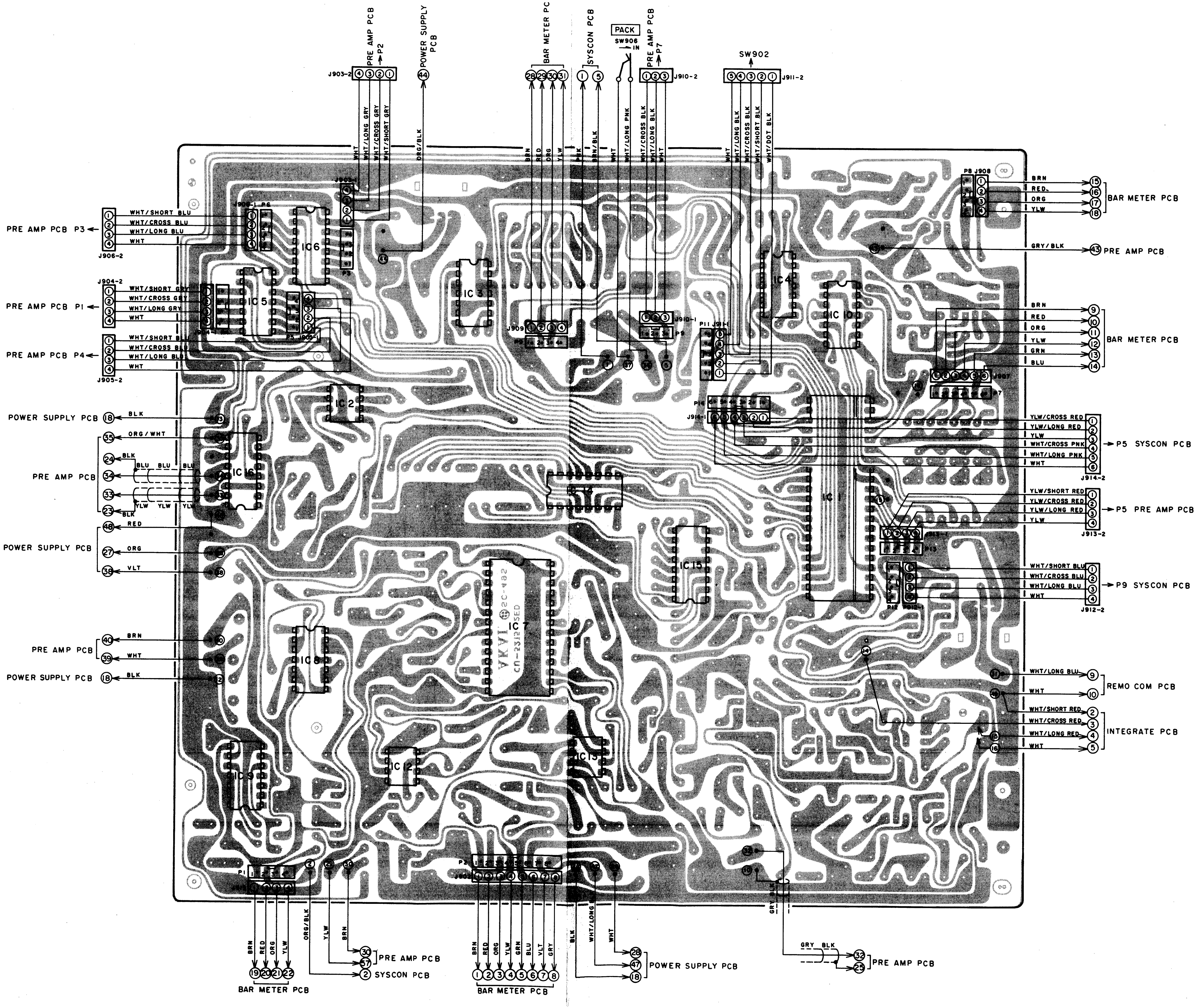
IC12
IC13
IC14
IC15
IC16


TEST SW
NORMAL
TEST
IC3 HD74LS02P
IC4 HD74LS02
IC1 HD74LS02P
IC5,6 TC4520BP
IC2 NJM4558D
VR3,4 A-D CONVERSION VOLTAGE
IC14 TC4051BP
IC16 TC4053BP
IC11 μPD4049C
IC15 TC4051BP
IC7 μPPC625C
IC8 TC4066BP
IC9 HD74107P
IC13 NJM4558D
IC12 NJM4558D
VR7,5 VU METER INPUT VOLTAGE
VR8,6 PEAK METER SENS
10KHz FILTER LEVEL
Rch 1KHz FILTER LEVEL
VU METER SENS
SKY/BLK
GRN
YLW
BLK
TR47
VOLTAGE MEASURED WITH NORMAL TAPE IN AND DECK IN STOP MODE

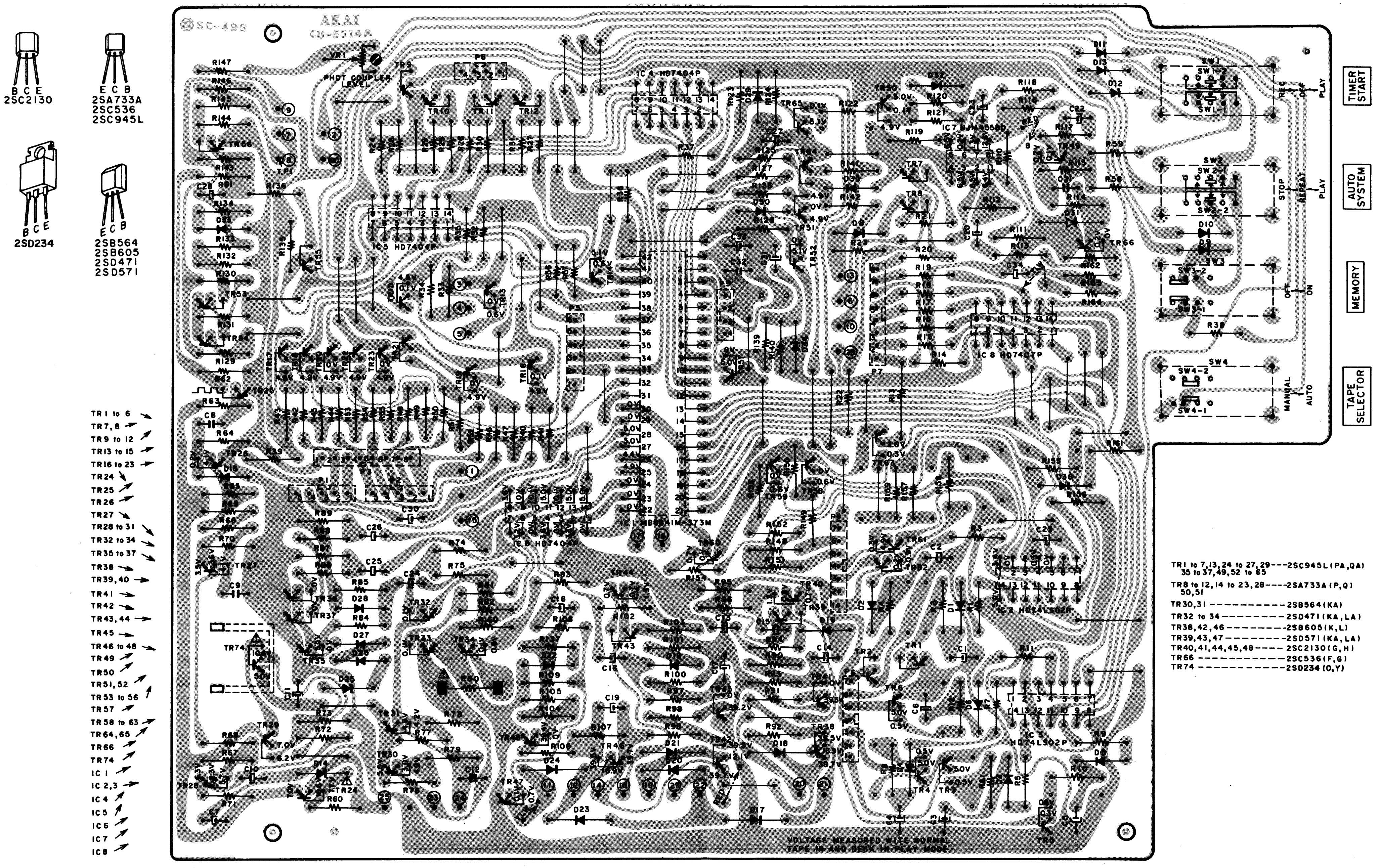
TR1 to 11, 16 to 22, 34 to 37, 40 to 45, 48 --- 2SC945L(PA,QA)
TR12 to 15, 23 to 33, 38, 39, 49 ---------- 2SA733A(P,Q)
TR46 ------------------------ 2SD794(P,Q)
TR47 ------------------------ 2SD837(P,Q)

WARNING: ⚠INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS

AVERTISSEMENT: ⚠IL INDIQU LES COMPOSANTS CRITIQUES DE SÛRETÉ. POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACER LES CONPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT


PRE AMP PCB
→ P2
J903-2
POWER SUPPLY PCB
BAR METER PCB
SYSCON PCB
PACK
SW906
IN
PRE AMP PCB
→ P7
J910-2
SW902
J911-2
WHT
WHT/LONG GRY
WHT/CROSS GRY
WHT/SHORT GRY
ORG/BLK
BRN
RED
ORG
YLW
PNK
BRN/BLK
WHT/LONG PNK
WHT/CROSS BLK
WHT/LONG BLK
WHT/SHORT BLK
WHT/DOT BLK
PRE AMP PCB P3
J906-2
WHT/SHORT BLU
WHT/CROSS BLU
WHT/LONG BLU
PRE AMP PCB P1
J904-2
WHT/SHORT GRY
WHT/CROSS GRY
WHT/LONG GRY
PRE AMP PCB P4
J905-2
POWER SUPPLY PCB
BLK
ORG/WHT
PRE AMP PCB
BLU
YLW
RED
ORG
VLT
BRN
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC8
IC9
IC10
IC12
IC13
IC14
IC15
IC16
AKAI
CN-23
J908
P8
GRY/BLK
PRE AMP PCB
GRN
BLU
J907
P7
YLW/CROSS RED
YLW/LONG RED
WHT/CROSS PNK
WHT/LONG PNK
P5 SYSCON PCB
J914-2
YLW/SHORT RED
P5 PRE AMP PCB
J913-2
P9 SYSCON PCB
J912-2
WHT/LONG BLU
REMO COM PCB
WHT/SHORT RED
WHT/CROSS RED
WHT/LONG RED
INTEGRATE PCB
P1
J901
P2
J902
GRY
BAR METER PCB
SYSCON PCB
POWER SUPPLY PCB
WHT/LONG
GRY BLK

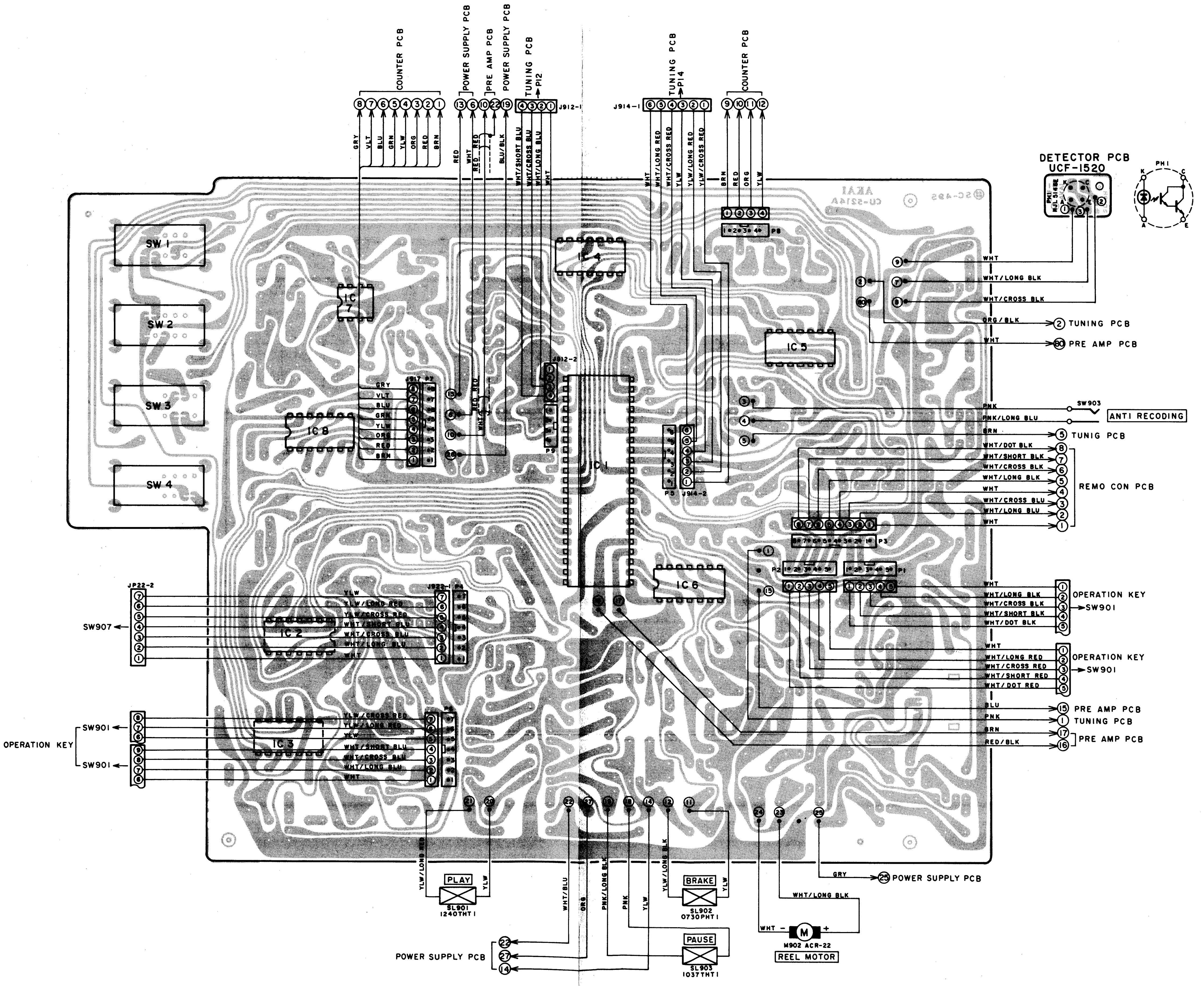
3) SYSCON P.C BOARD CU-5214A and DETECTOR P.C BOARD UCF-1520


B C E
2SC2130
E C B
2SA733A
2SC536
2SC945L
B C E
2SD234
E C B
2SB564
2SB605
2SD471
2SD571
AKAI
CU-5214A
SC-49S
PHOTO COUPLER LEVEL
VR1
TP1
IC 1 MB8841M-373M
IC 2 HD74LS02P
IC 3 HD74LS02P
IC 4 HD7404P
IC 5 HD7404P
IC 6 HD7404P
IC 7 M54556P
IC 8 HD7407P
SW1
SW2
SW3
SW4
REC
OFF
PLAY
STOP
REPEAT
ON
MANUAL
AUTO
TIMER START
AUTO SYSTEM
MEMORY
TAPE SELECTOR
VOLTAGE MEASURED WITH NORMAL TAPE IN AND DECK IN PLAY MODE
TR1 to 6
TR7,8
TR9 to 12
TR13 to 15
TR16 to 23
TR24
TR25
TR26
TR27
TR28 to 31
TR32 to 34
TR35 to 37
TR38
TR39,40
TR41
TR42
TR43,44
TR45
TR46 to 48
TR49
TR50
TR51,52
TR53 to 56
TR57
TR58 to 63
TR64,65
TR66
TR74
IC 1
IC 2,3
IC 4
IC 5
IC 6
IC 7
IC 8

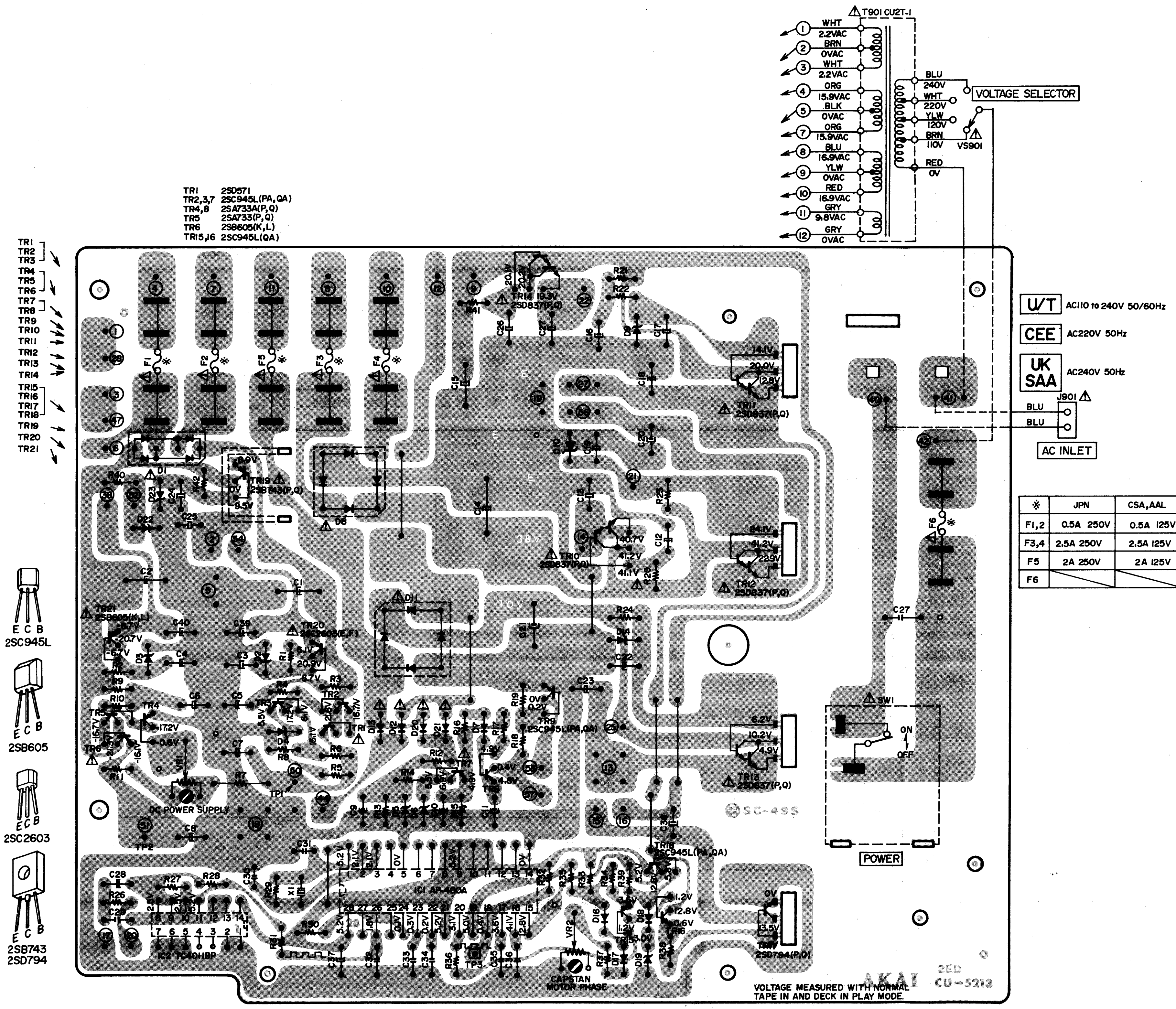
TR1 to 7,13,24 to 27,29---2SC945L(PA,QA)
35 to 37,49,52 to 65
TR8 to 12,14 to 23,28----2SA733A(P,Q)
50,51
TR30,31 ------------2SB564(KA)
TR32 to 34-----------2SD471(KA,LA)
TR38,42,46----------2SB605(K,L)
TR39,43,47----------2SD571(KA,LA)
TR40,41,44,45,48----- 2SC2130(G,H)
TR66 ---------------2SC536(F,G)
TR74 ---------------2SD234(O,Y)

WARNING: ⚠INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS

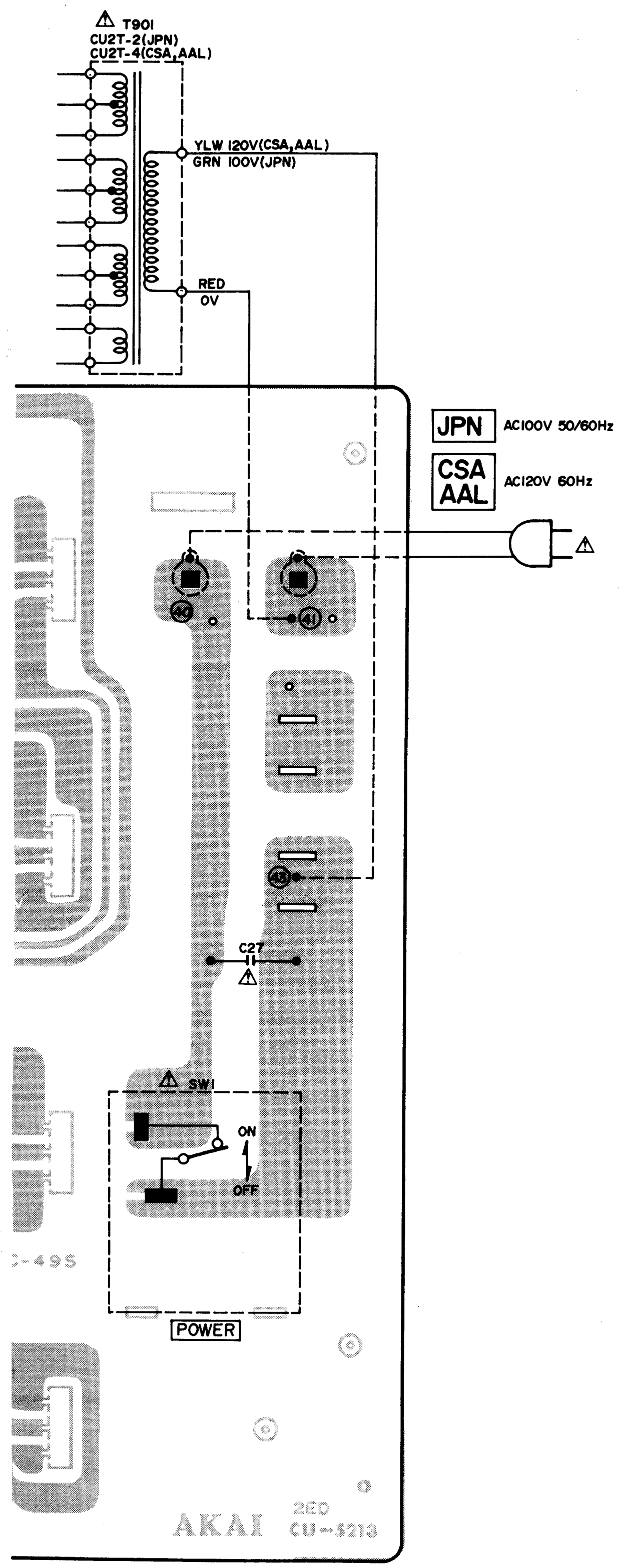
AVERTISSEMENT: ⚠IL INDIQU LES COMPOSANTS CRITIQUES DE SÛRETÉ. POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACER LES CONPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT


COUNTER PCB
POWER SUPPLY PCB
PRE AMP PCB
POWER SUPPLY PCB
TUNING PCB
→P12
J912-1
J914-1
TUNING PCB
→P14
COUNTER PCB
GRY
VLT
BLU
GRN
YLW
ORG
RED
BRN
WHT/SHORT BLU
WHT/CROSS BLU
WHT/LONG BLU
WHT
WHT/LONG RED
WHT/CROSS RED
YLW/LONG RED
YLW/CROSS RED
DETECTOR PCB
UCF-1520
PH1
K
C
A
E
SW 1
SW 2
SW 3
SW 4
IC 7
IC 8
IC 4
IC 5
IC 1
IC 6
IC 2
IC 3
J917
P7
J912-2
P9
P5
J914-2
P8
P3
P2
P1
WHT/LONG BLK
WHT/CROSS BLK
ORG/BLK
TUNING PCB
PRE AMP PCB
PNK
PNK/LONG BLU
SW903
ANTI RECODING
BRN
TUNIG PCB
WHT/DOT BLK
WHT/SHORT BLK
REMO CON PCB
OPERATION KEY
→SW901
WHT/SHORT RED
WHT/DOT RED
PRE AMP PCB
TUNING PCB
RED/BLK
PRE AMP PCB
JP22-2
JP22-1
P4
SW907←
YLW
YLW/LONG RED
YLW/CROSS RED
P6
YLW/CROSS RED
YLW/LONG RED
SW901←
OPERATION KEY
SW901←
AKAI
CU-5214A
SC-495
YLW/LONG RED
PLAY
SL901
1240THT1
WHT/BLU
ORG
PNK/LONG BLK
PNK
YLW/LONG BLK
BRAKE
SL902
0730PHT1
PAUSE
SL903
1037THT1
POWER SUPPLY PCB
GRY
POWER SUPPLY PCB
WHT/LONG BLK
WHT
M
M902 ACR-22
REEL MOTOR

4) POWER SUPPLY P.C BOARD CU-5313 (2ED)

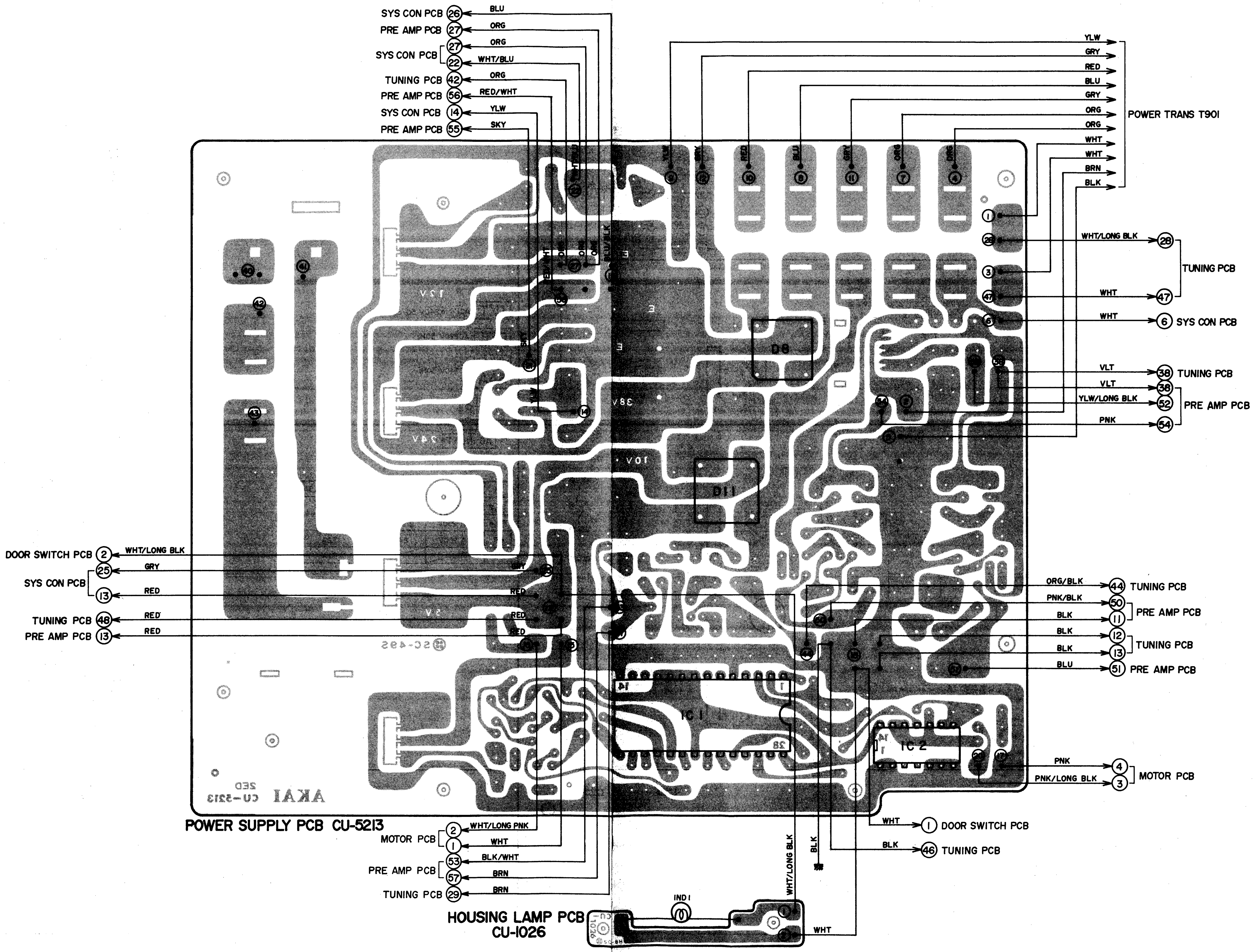

TR1 2SD571
TR2,3,7 2SC945L(PA,QA)
TR4,8 2SA733A(P,Q)
TR5 2SA733(P,Q)
TR6 2SB605(K,L)
TR15,16 2SC945L(QA)
E C B
2SC945L
2SB605
2SC2603
2SB743
2SD794
⚠T901 CU2T-1
WHT 2.2VAC
BRN 0VAC
WHT 2.2VAC
ORG 15.9VAC
BLK 0VAC
ORG 15.9VAC
BLU 16.9VAC
YLW 0VAC
RED 16.9VAC
GRY 9.8VAC
GRY 0VAC
BLU 240V
WHT 220V
YLW 120V
BRN 110V
RED 0V
VOLTAGE SELECTOR
VS901
U/T AC110 to 240V 50/60Hz
CEE AC220V 50Hz
UK SAA AC240V 50Hz
J901
BLU
BLU
AC INLET
DC POWER SUPPLY
CAPSTAN MOTOR PHASE
IC1 AP-400A
IC2 TC4011BP
SW1
ON
OFF
POWER
AKAI 2ED CU-5213
VOLTAGE MEASURED WITH NORMAL TAPE IN AND DECK IN PLAY MODE.

※	JPN	CSA,AAL	U/T,CEE,UK,SAA
F1,2	0.5A 250V	0.5A 125V	T0.5A
F3,4	2.5A 250V	2.5A 125V	T2.5A
F5	2A 250V	2A 125V	T2A
F6			T1A

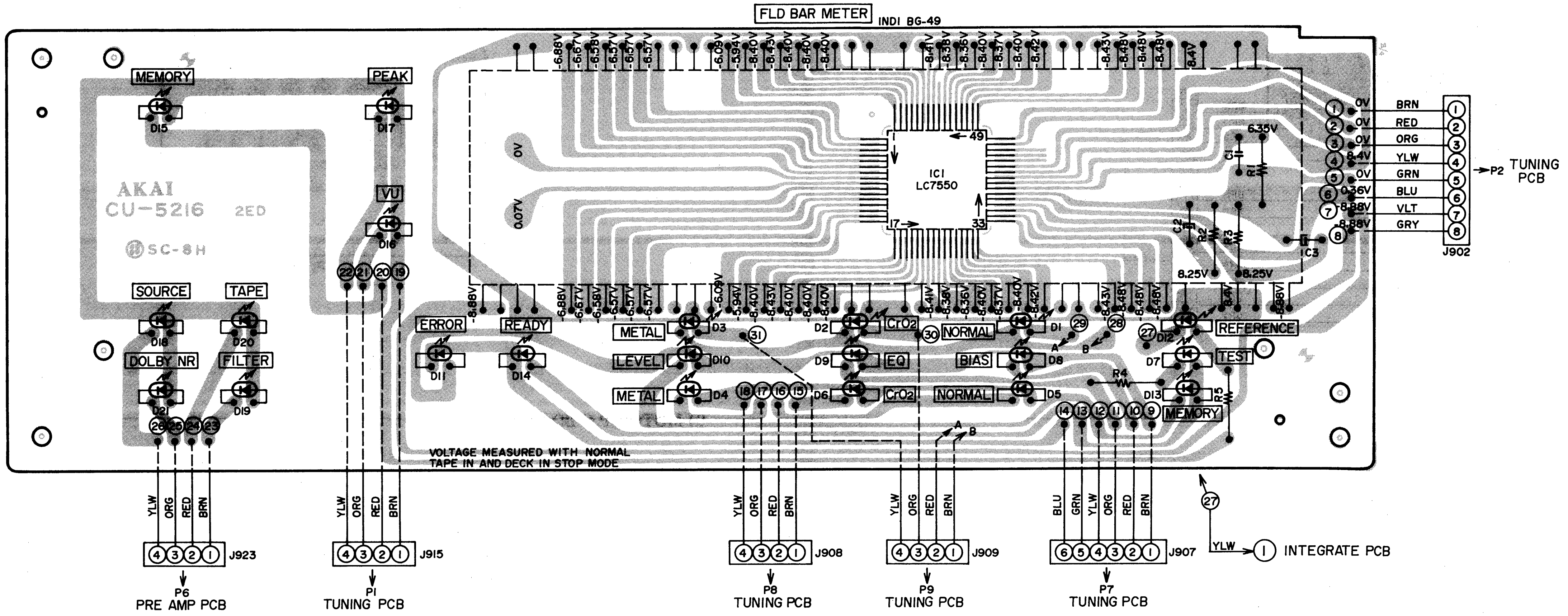

⚠ T901
CU2T-2(JPN)
CU2T-4(CSA,AAL)
YLW 120V(CSA,AAL)
GRN 100V(JPN)
RED 0V
JPN AC100V 50/60Hz
CSA AAL AC120V 60Hz
SW1
ON
OFF
POWER
AKAI 2ED CU-5213

WARNING: ⚠INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS

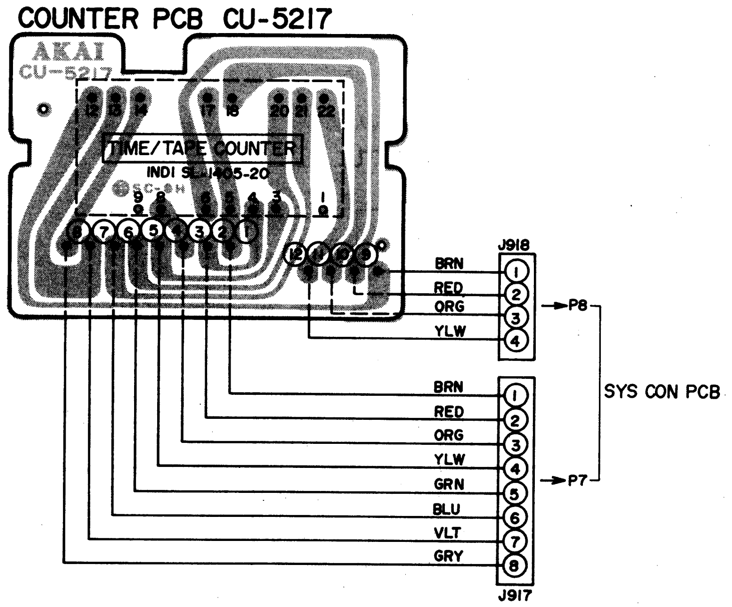
AVERTISSEMENT: ⚠IL INDIQU LES COMPOSANTS CRITIQUES DE SÛRETÉ. POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACER LES CONPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT


SYS CON PCB 26 BLU
PRE AMP PCB 27 ORG
SYS CON PCB 27 ORG
22 WHT/BLU
TUNING PCB 42 ORG
PRE AMP PCB 56 RED/WHT
SYS CON PCB 14 YLW
PRE AMP PCB 55 SKY
YLW
GRY
RED
BLU
GRY
ORG
ORG
WHT
WHT
BRN
BLK
POWER TRANS T901
WHT/LONG BLK 28
TUNING PCB
WHT 47
WHT 6 SYS CON PCB
VLT 38 TUNING PCB
VLT 38
YLW/LONG BLK 52
PNK 54
PRE AMP PCB
DOOR SWITCH PCB 2 WHT/LONG BLK
SYS CON PCB 25 GRY
13 RED
TUNING PCB 48 RED
PRE AMP PCB 13 RED
ORG/BLK 44 TUNING PCB
PNK/BLK 50
BLK 11
PRE AMP PCB
BLK 12
BLK 13
TUNING PCB
BLU 51 PRE AMP PCB
PNK 4
PNK/LONG BLK 3
MOTOR PCB
D9
D11
IC 1
IC 2
12V
24V
38V
10V
5V
AKAI
CU-5213
POWER SUPPLY PCB CU-5213
MOTOR PCB 2 WHT/LONG PNK
1 WHT
PRE AMP PCB 53 BLK/WHT
57 BRN
TUNING PCB 29 BRN
WHT/LONG BLK
BLK
WHT 1 DOOR SWITCH PCB
BLK 46 TUNING PCB
IND1
HOUSING LAMP PCB
CU-1026
WHT

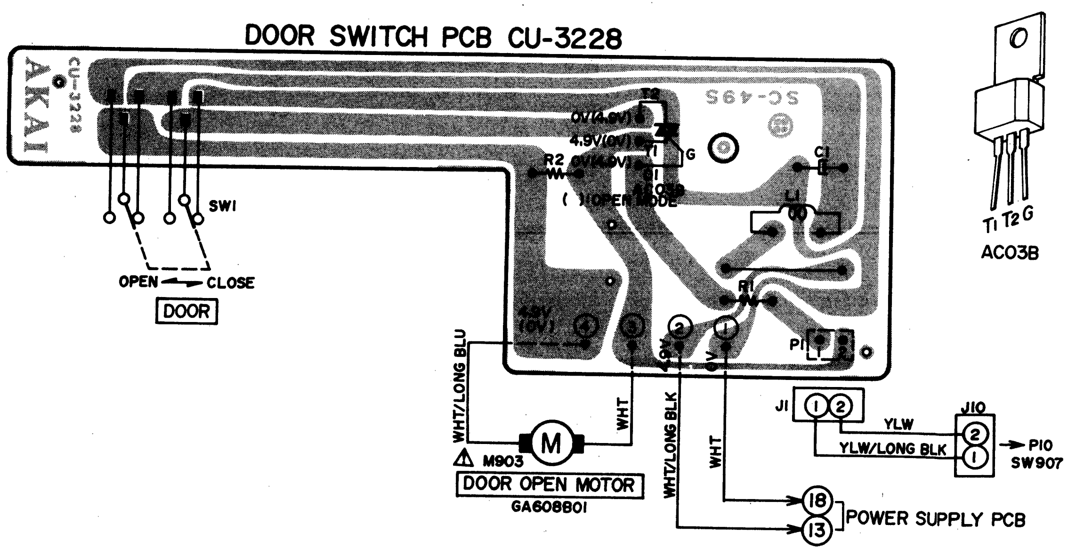
5) BAR METER P.C BOARD CU-5216 (2ED)


FLD BAR METER
INDI BG-49
-6.86V
-6.67V
-6.58V
-6.57V
-6.57V
-6.57V
-6.09V
-5.94V
-8.40V
-8.43V
-8.40V
-8.40V
-8.40V
-8.41V
-8.38V
-8.36V
-8.40V
-8.37V
-8.40V
-8.42V
-8.43V
-8.48V
-8.48V
-8.48V
-8.4V
-8.88V
MEMORY
D15
PEAK
D17
VU
D16
AKAI
CU-5216 2ED
SC-8H
SOURCE
TAPE
D18
D20
DOLBY NR
FILTER
D21
D19
26
25
24
23
22
21
20
19
0V
0.07V
IC1
LC7550
1
49
17
33
ERROR
READY
D11
D14
METAL
D3
LEVEL
D10
METAL
D4
31
18
17
16
15
D6
D2
CrO2
D9
EQ
CrO2
30
NORMAL
BIAS
NORMAL
D1
D8
D5
29
28
27
D12
REFERENCE
TEST
D7
D13
MEMORY
R4
R5
14
13
12
11
10
9
A
B
6.35V
C1
R1
C2
R2
R3
IC3
8.25V
8.25V
0V
0V
0V
8.4V
0V
0.36V
8.88V
8.88V
BRN
RED
ORG
YLW
GRN
BLU
VLT
GRY
J902
P2 TUNING PCB
VOLTAGE MEASURED WITH NORMAL TAPE IN AND DECK IN STOP MODE
YLW
ORG
RED
BRN
J923
P6
PRE AMP PCB
J915
P1
TUNING PCB
J908
P8
TUNING PCB
J909
P9
TUNING PCB
BLU
GRN
J907
P7
TUNING PCB
27
YLW
INTEGRATE PCB

6) COUNTER P.C BOARD CU-5217


COUNTER PCB CU-5217
AKAI
CU-5217
TIME/TAPE COUNTER
INDI SL-1405-20
SC-8H
BRN
RED
ORG
YLW
J918
P8
SYS CON PCB
BRN
RED
ORG
YLW
GRN
BLU
VLT
GRY
P7
J917

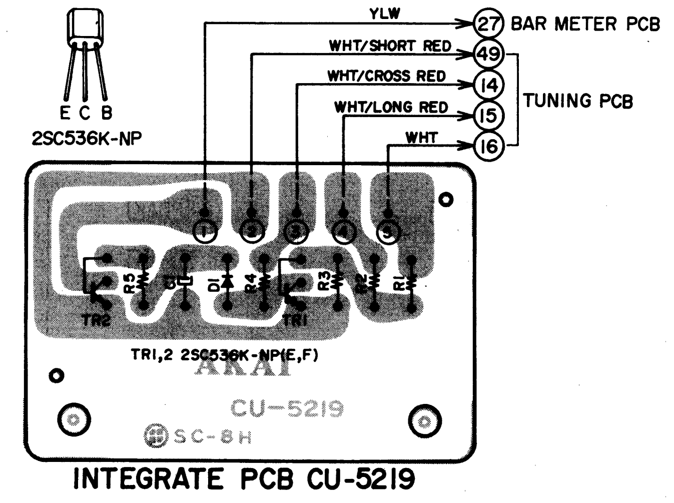
7) DOOR SWITCH P.C BOARD CU-3228


DOOR SWITCH PCB CU-3228
AKAI
CU-3228
SC-495
SW1
OPEN ◄—► CLOSE
DOOR
0V(4.9V)
4.9V(0V)
0V(4.9V)
R2
( ) IOPEN MODE
C1
R1
P1
⚠ M903
M
DOOR OPEN MOTOR
GA608801
WHT/LONG BLU
WHT
WHT/LONG BLK
WHT
J1
YLW
YLW/LONG BLK
J10
P10
SW907
POWER SUPPLY PCB
T1 T2 G
AC03B

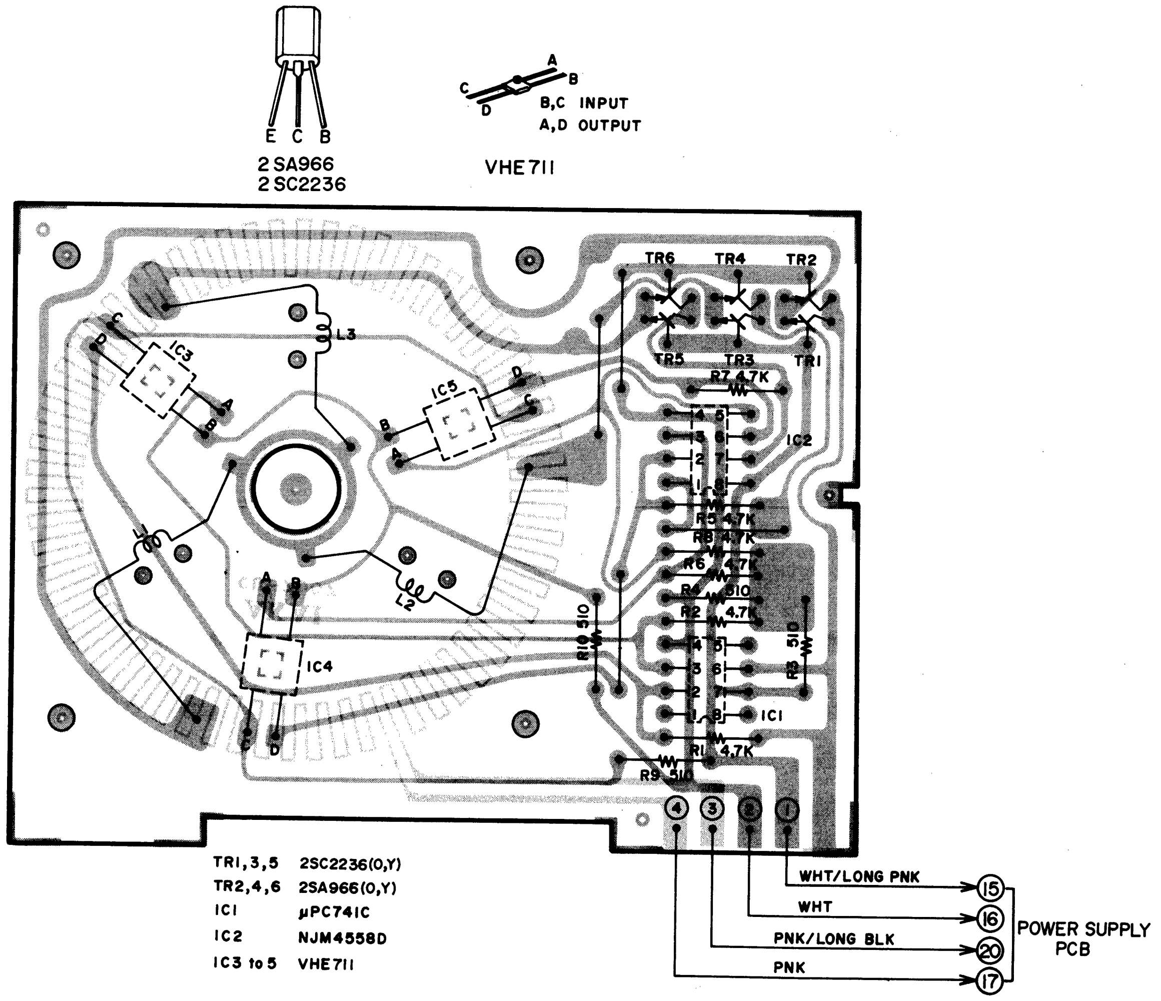
WARNING: ⚠INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS

AVERTISSEMENT: ⚠IL INDIQU LES COMPOSANTS CRITIQUES DE SÛRETÉ. POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACER LES CONPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT

8) INTEGRATED P.C BOARD CU-5219

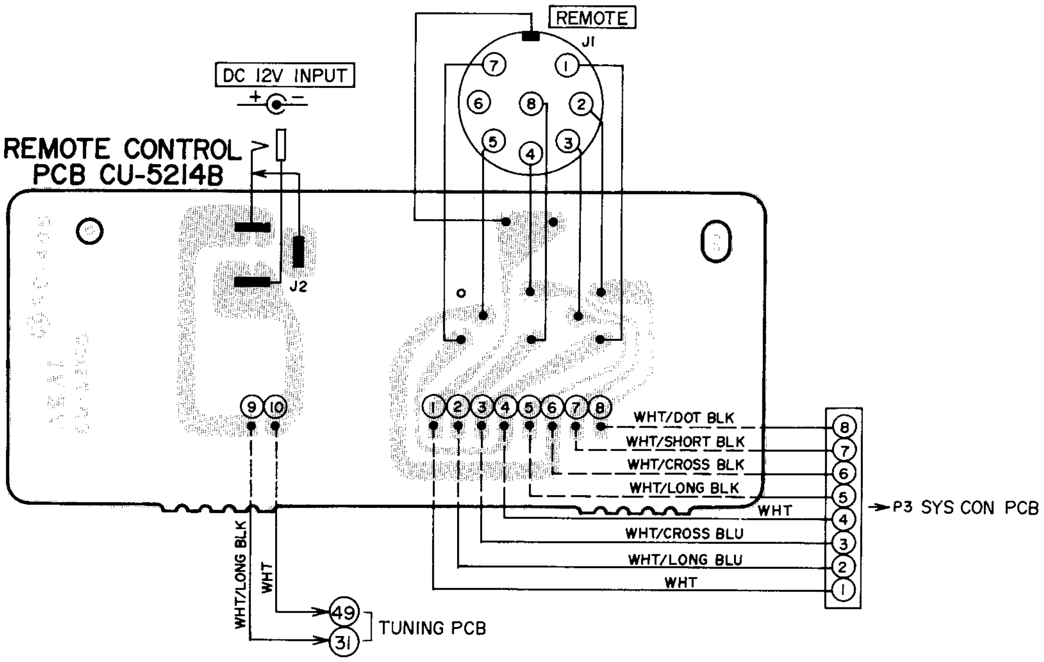

E C B
2SC536K-NP
YLW
WHT/SHORT RED
WHT/CROSS RED
WHT/LONG RED
WHT
27 BAR METER PCB
49
14
15
16
TUNING PCB
R5
D2
D1
R4
R3
R2
R1
TR2
TR1
TR1,2 2SC536K-NP(E,F)
AKAI
CU-5219
SC-8H
INTEGRATE PCB CU-5219

9) MOTOR P.C BOARD CU-7007


E C B
2SA966
2SC2236
A
B
C
D
B,C INPUT
A,D OUTPUT
VHE711
TR6
TR4
TR2
TR5
TR3
TR1
R7 4.7K
IC2
IC3
IC5
IC4
L1
L2
L3
R5 4.7K
R8 4.7K
R6
R4 510
R2 4.7K
R10 510
R3 510
IC1
R1 4.7K
R9 510
WHT/LONG PNK
WHT
PNK/LONG BLK
PNK
15
16
20
17
POWER SUPPLY PCB

TR1,3,5	2SC2236(O,Y)
TR2,4,6	2SA966(O,Y)
IC1	μPC741C
IC2	NJM4558D
IC3 to 5	VHE711

10) REMOTE CONTROL P.C BOARD CU-5214B


REMOTE
J1
7
1
6
8
2
5
4
3
DC 12V INPUT
+ −
REMOTE CONTROL
PCB CU-5214B
J2
9
10
1
2
3
4
5
6
7
8
WHT/DOT BLK
WHT/SHORT BLK
WHT/CROSS BLK
WHT/LONG BLK
WHT
WHT/CROSS BLU
WHT/LONG BLU
WHT
8
7
6
5
4
3
2
1
P3 SYS CON PCB
WHT/LONG BLK
WHT
49
31
TUNING PCB

MEMO

MEMO

MEMO

MEMO

MEMO

SECTION 2

PARTS LIST

TABLE OF CONTENTS

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3. SUB FRAME BLOCK 76
4. MECHA BLOCK 78
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8. AUTO TUNING P.C BOARD BLOCK 82
9. POWER SUPPLY P.C BOARD BLOCK 83
10. BAR METER P.C BOARD BLOCK 83
11. COUNTER P.C BOARD BLOCK 83
12. INTEGRAL P.C BOARD BLOCK 83
13. MOTOR P.C BOARD BLOCK 83
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INDEX 86

Resistor and Capacitor which is not listed in this parts list, please refer to COMMON LIST FOR SERVICE PARTS.

HOW TO USE THIS PARTS LIST

1. This parts list is compiled by various individual blocks based on assembly process.
2. When ordering parts, please describe parts number, serial number, and model number in detail.
3. How to read List

The reference number corresponds with illustration or photo number of that particular parts list.

This number corresponds with the Figure Number.

This number corresponds with the individual parts index number in that figure.

A small "x" indicates the inability to show that particular part in the Photo or Illustration.

12-115x

Ref. No.	Parts No.	Description
		FLYWHEEL BLOCK #13
12-115x	800425	Flywheel Block Assy. Comp.
12-116	244506	Flywheel Only
12-117x	244754	Felt, Flywheel
12-118	251324	Main Metal Case
12-119	253080	Main Metal

4. The symbol numbers shown on the P.C. Board list can be matched with the Composite Views of Components of the Schematic Diagram or Service Manual.
5. Please utilize separate "Common List for Service Parts" for Resistor Parts orders.
6. The shape of the parts and parts name, etc. can be confirmed by comparing them with the parts shown on the Electrical Parts Table of P.C. Board.
7. Both the kind of part and installation position can be determined by the Parts Number. To determine where a parts number is listed, utilize Parts Index at end of Parts List.
   It is necessary first of all to find the Parts Number. This can be accomplished by using the Reference Number listed at right of parts number in the Parts Index. (meaning of ref. no. outlined in Item 3 above).
8. Utilize separate "Price List for Parts" to determine unit price. The most simple method of finding parts Price is to utilize the reference number.

CAUTION:
1. When placing an order for parts, be sure to list the parts no. model no., and description. There are instances in which if any of this information is omitted, parts cannot be shipped or the wrong parts will be delivered.
2. Please be careful not to make a mistake in the parts no. If the parts no. is in error, a part different from the one ordered may be delivered.
3. Because parts number and parts unit supply in the Preliminary Service Manual (Basic Parts List) may be partially changed, please use this parts list for all future reference.

WARNING: ⚠ INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.

AVERTISSEMENT: ⚠ IL INDIQU LES COMPOSANTS CRITIQUES DE SURETE. POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACER LES COMPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT.

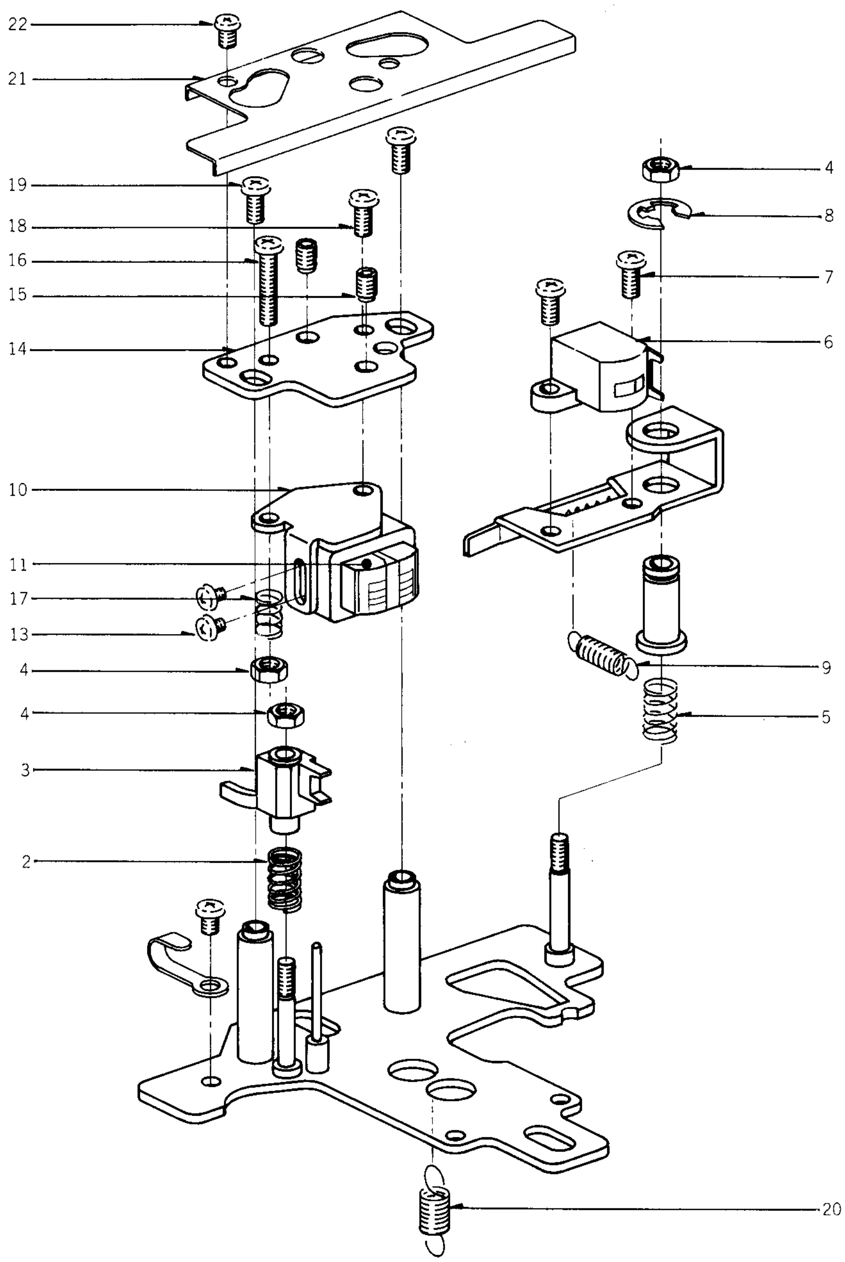
1. RECOMMENDED SPARE PARTS

Because, if the parts listed below are on hand, almost any repair can be accomplished, we suggest that you stock these Recommended Spare Parts Items.

REF. NO.	PARTS NO.	DESCRIPTION
1-1	BHT2018A440A	HEAD BASE BLK GX-F95
1-2	BKT2008A570A	OPERATION KEY ASSY GX-F90
1-3	BKT2008A570B	OPERATION KEY ASSY GX-F90-BL
1-4	BMM3101A020A	⚠ MOTOR BLM-100B
1-5	BM305728	⚠ MOTOR GA608B01
1-6	BMT2008A130A	⚠ REEL MOTOR BLK W/PULLEY GX-F90
1-7	BT201246	⚠ TRANS POWER CU2T-1 (U,E,B,S)
1-8	BT201247	⚠ TRANS POWER CU2T-2 (J)
1-9	BT201248	⚠ TRANS POWER CU2T-4 (C,A)
1-10	EA307003	IND PC
1-11	EC315346	C S-FIX H ECV-1ZW50x32E 5.0-55
1-12	ED308953	D GERMA H 1K34A-LH SNP
1-13	ED308952	D GERMA V 1K34A-LR F07
1-14	ED322247	D LED SLP-151D RED
1-15	ED322215	D LED SLP-251D GRN
1-16	ED200469	D SILICON H DS448 FA1 F10
1-17	ED316143	D SILICON H 1S2473HS F10
1-18	ED200468	D SILICON V DS448 VB3
1-19	ED560913	D SILICON V 1S2473VE
1-20	ED323979	D SILICON W03B F12 150/1.0A
1-21	ED306109	D SILICON W03B 100/1.0A
1-22	ED322238	D SILICON 1B4B41 100/1.0A
1-23	ED322299	D SILICON 10D1FA-2 F12 100/1.0A
1-24	ED326496	D SILICON 3B4B41 100/3.0A
1-25	ED319463	D SILICON 4B4B41 100/4.0A
1-26	ED313513	D THYRISTOR SF0R1B41 100V 0.10A
1-27	ED306983	D ZENER H HZ12 C3
1-28	ED306320	D ZENER H HZ15 2
1-29	ED306015	D ZENER H HZ24 2
1-30	ED305704	D ZENER H HZ4 B2
1-31	ED302269	D ZENER H HZ5 A2
1-32	ED306316	D ZENER H HZ5 C2
1-33	ED306010	D ZENER H HZ6 A2
1-34	ED300035	D ZENER H HZ6 B3
1-35	ED319167	D ZENER H HZ6 C3
1-36	ED307610	D ZENER H HZ7 A2
1-37	ED306012	D ZENER H HZ7 A3
1-38	ED305706	D ZENER H HZ7 B3
1-39	ED306013	D ZENER H HZ7 C1
1-40	ED302295	D ZENER H HZ7 C3
1-41	ED306014	D ZENER H HZ9 C3
1-42	ED200620	THERMISTER TD5-C320D
1-43	ED305750	THERMISTER TD5-C350D
1-44	EF593706	⚠ FUSE SEMKO T 250V 0.50A (U,E,B,S) (F1,2)
1-45	EF623103	⚠ FUSE SEMKO T 250V 1A (U,E,B,S) (F6)
1-46	EF623125	⚠ FUSE SEMKO T 250V 2.5A (U,E,B,S) (F3,4)
1-47	EF601301	⚠ FUSE SEMKO T 250V 2A (U,E,B,S) (F5)
1-48	EF327103	⚠ FUSE TSC A 250V 0.50A (J) (F1,2)
1-49	EF306951	⚠ FUSE TSC A 250V 2.5A (J) (F3,4)
1-50	EF306950	⚠ FUSE TSC A 250V 2A (J) (F5)
1-51	EF309390	⚠ FUSE TSC 125V 0.50V (C,A) (F1,2)
1-52	EF306956	⚠ FUSE TSC 125V 2.5A (C,A) (F3,4)
1-53	EF306954	⚠ FUSE TSC 125V 2A (C,A) (F5)
1-54	EI324668	D THYRISTOR AC03BGML 200V 3.00A
1-55	EI325557	IC AP-400-A (TM4504P)
1-56	EI302409	IC HD74LS02P
1-57	EI201549	IC HD7404P
1-58	EI201550	IC HD7407P
1-59	EI322993	IC HD74107P
1-60	EI306141	IC LA4170
1-61	EI325755	IC LC7550
1-62	EI306009	IC LM1111A
1-63	EI300812	IC MB8841M (373M)
1-64	EI318922	IC MB8841M (424M)
1-65	EI213390	IC NJM4558D
1-66	EI304657	IC TC4011BP
1-67	EI302233	IC TC4051BP
1-68	EI200573	IC TC4053BP
1-69	EI310036	IC TC4066BP
1-70	EI300834	IC TC4520BP
1-71	EI317652	IC μPC629C
1-72	EI319555	IC μPD4049C
1-73	EI201531	OSC X'TAL HC-18/U 6.022/30MHZ
1-74	EI318384	OSC X'TAL NC-18C 3.57954MHZ
1-75	EI324061	PHOTO SENSOR NJL5146E
1-76	EJ301513	⚠ SOCKET INLET S-I6453 E 2P (U,E,B,S)
1-77	EJ200618	SOCKET INLET HEC470-630
1-78	EL317634	LAMP 5V 60MA
1-79	EL317599	PL H LEAD 6.3V 100MA
1-80	EM317556	IND FL BG-49 GRAPH
1-81	EM201809	IND LE SL-1405-20 CHARACTER
1-82	EP200835	⚠ SOLENOID 0730PHT1
1-83	EP305795	⚠ SOLENOID 1037THT1
1-84	EP200836	⚠ SOLENOID 1240PHT1
1-85	EP308973	RELAY LEAD LAB2NS 2NO 24V
1-86	ER322265	⚠ R CT P SNP 5W 130J
1-87	ER305791	⚠ R FUSE FR25SJ 1/4J 100J
1-88	ER308896	⚠ R FUSE FR25SJ 1/4W 470J
1-89	ER305772	⚠ R FUSE FR25SJ 1/4W 6R8J
1-90	ER313699	⚠ R OMF H FS 2W 221J
1-91	ER306006	⚠ R OMF H FS 2W 222J
1-92	ER328490	FILTER DB D07-001K 19KHZ
1-93	ER328491	FILTER DB D07-003K 100KHZ
1-94	ES305733	⚠ SW SELECTOR HXW0131-260 01-4 (U,E,B,S)
1-95	ES324063	SW LEAF BSW-47P 01-1 NO
1-96	ES317622	SW LEAF BSW-47PB 01-1 NO
1-97	ES305721	SW LEAF MSW-1145 01-1 NO
1-98	ES201526	SW LEVER SLR522 2-02-02N
1-99	ES201525	SW LEVER SLR523 2-02-03N
1-100	ES315747	SW LEVER 42388 2-04-02N
1-101	ES315748	SW LEVER 83157 2-08-03S
1-102	ES315159	SW PUSH SDG1P 01-1 J
1-103	ES310839	SW PUSH SDG1P-E 01-1 E
1-104	ES665875	SW PUSH SDG1P-J 01-1 UC
1-105	ES201527	SW SLIDE SSS212 1-01-02N
1-106	ES201548	SW SNAP SAC-22D 02-2
1-107	ET302405	TR FET 2SK150 GR
1-108	ET301464	TR FET 2SK68 M,N
1-109	ET623790	TR 2SA640 E,F
1-110	ET554657	TR 2SA733A P,Q
1-111	ET302396	TR 2SA979 F,G
1-112	ET317688	TR 2SB564 K
1-113	ET666415	TR 2SB605 K,L
1-114	ET318125	TR 2SB743 P,Q
1-115	ET308937	TR 2SC2130 G,H
1-116	ET304825	TR 2SC2259 F,G
1-117	ET200505	TR 2SC2603 E,F
1-118	ET391768	TR 2SC458LG C,D
1-119	ET316171	TR 2SC536K-NP E,F
1-120	ET316643	TR 2SC536K-NP F,G
1-121	ET399846	TR 2SC945L Q
1-122	ET639437	TR 2SC945L Q,P
1-123	ET302370	TR 2SD471 K,L
1-124	ET666404	TR 2SD571 K,L
1-125	ET307349	TR 2SD794 P,Q
1-126	ET320296	TR 2SD837 P,Q

REF. NO.	PARTS NO.	DESCRIPTION
1-127	ET200986	TR 2SD863-V8 F
1-128	EV315542	R S-FIX H D8 3P 103
1-129	EV315540	R S-FIX H D8 3P 502
1-130	EV315541	R S-FIX H D8 3P 503
1-131	EV306016	R S-FIX H TM8K (PV) 3P 0.30W 101
1-132	EV306007	R S-FIX H TM8K(PV) 3P 0.30W 203
1-133	EV464231	R S-FIX H V8K4-1 3P 104
1-134	EV464196	R S-FIX H V8K4-1 3P 202
1-135	EV522797	R S-FIX H V8K4-1 3P 203
1-136	EV523620	R S-FIX H V8K4-1 3P 501
1-137	EV464220	R S-FIX H V8K4-1 3P 503
1-138	EV572433	R S-FIX H V8K4-1 3P 504
1-139	EV325331	VR ROTARY 16P11x0Q A503 A503
1-140	EV319081	VR ROTARY 16P20x1Z B103
1-141	HE315742	HEAD E E-921-PQ-0201 C
1-142	HPH2402A010A	HEAD COMBO PR4-5 C
1-143	MB323686	DETECTION BELT
1-144	MI321191	IDLER ASSY
1-145	MPB319580	PINCH ROLLER PART GX-F90
1-146	MTB312122	REEL TABLE PART GXC-715D

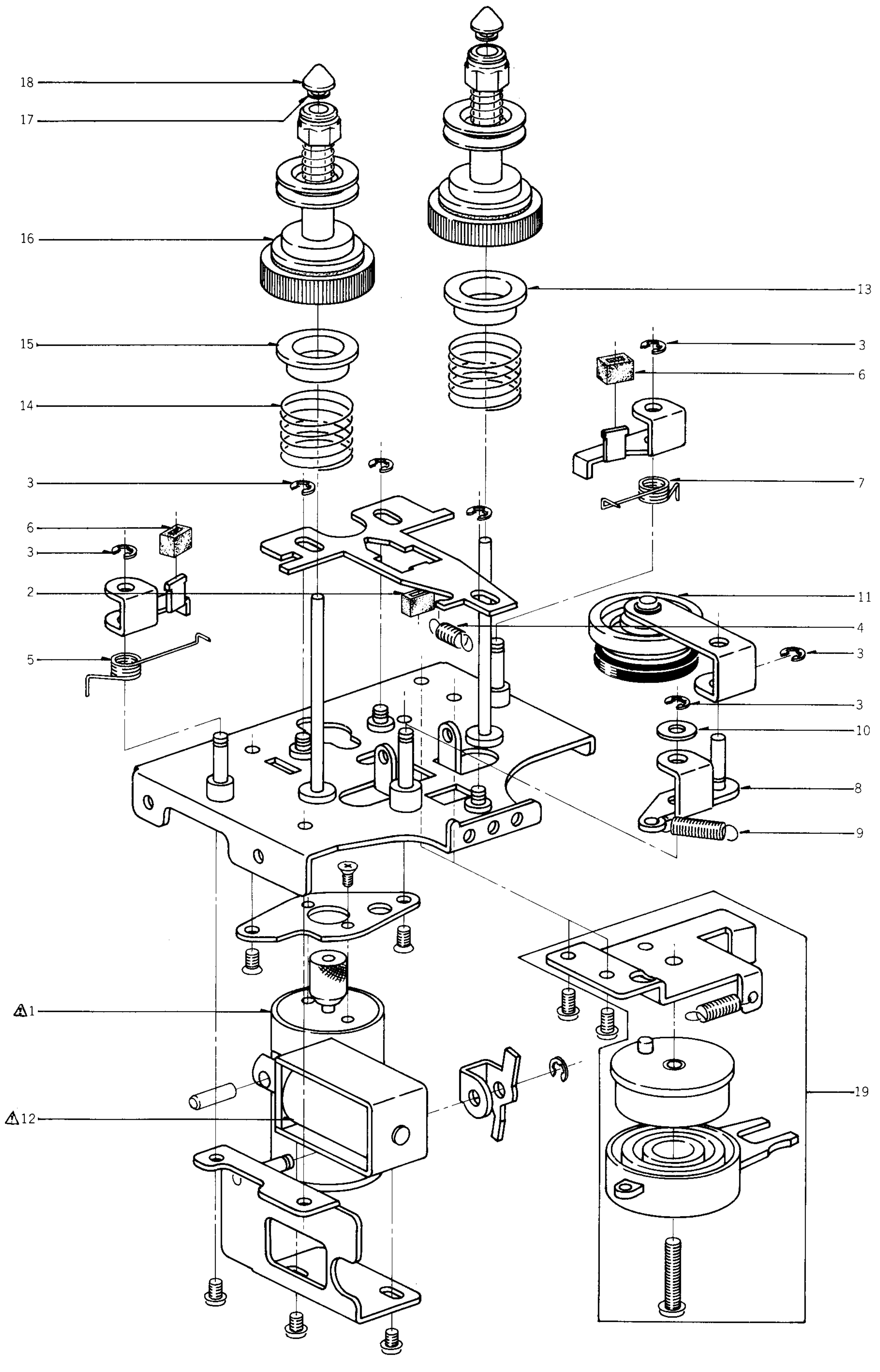
2. HEAD BASE BLOCK



HEAD BASE BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
2-1x	BHT2018A440A	HEAD BASE BLK GX-F95
2-2	ZG289236	TAPE GUIDE SPRING
2-3	HZ309128	TAPE GUIDE
2-4	ZW591265	N23BRS NI3 3
2-5	ZG313187	SP C-4.5/0.5-8.0 C-034
2-6	HE315742	HEAD E E-921-PQ-0201 C
2-7	ZS417227	BID23x05STL CMT
2-8	ZW270123	RING E400SUP CMT
2-9	ZG312946	SP T1-3.2/0.29-16.0 T1-062
2-10	HZ317352	HEAD HOLD PLATE
2-11	HPH2402A010A	HEAD COMBO PR4-5 C
2-12x	EA669510	PR4-1 TERMINAL P.C BOARD
2-13	ZS300626	PAN20x2.5STL CMT CAMERA
2-14	HZ317355	HEAD HUNGER
2-15	ZS356804	6SET30x040SCM PKR HP
2-16	ZS462947	PAN23x12STL CMT
2-17	ZG465636	ANGLE ADJUST SPRING
2-18	ZS590804	PAN23x06STL CMT
2-19	ZS419782	BID26x05STL CMT
2-20	ZG312996	SP T1-4.0/0.4-14.0 T1-110
2-21	SZ317672	HEAD DECORATION PLATE
2-22	ZS608174	PAN26x03STL NI3

3. SUB FRAME BLOCK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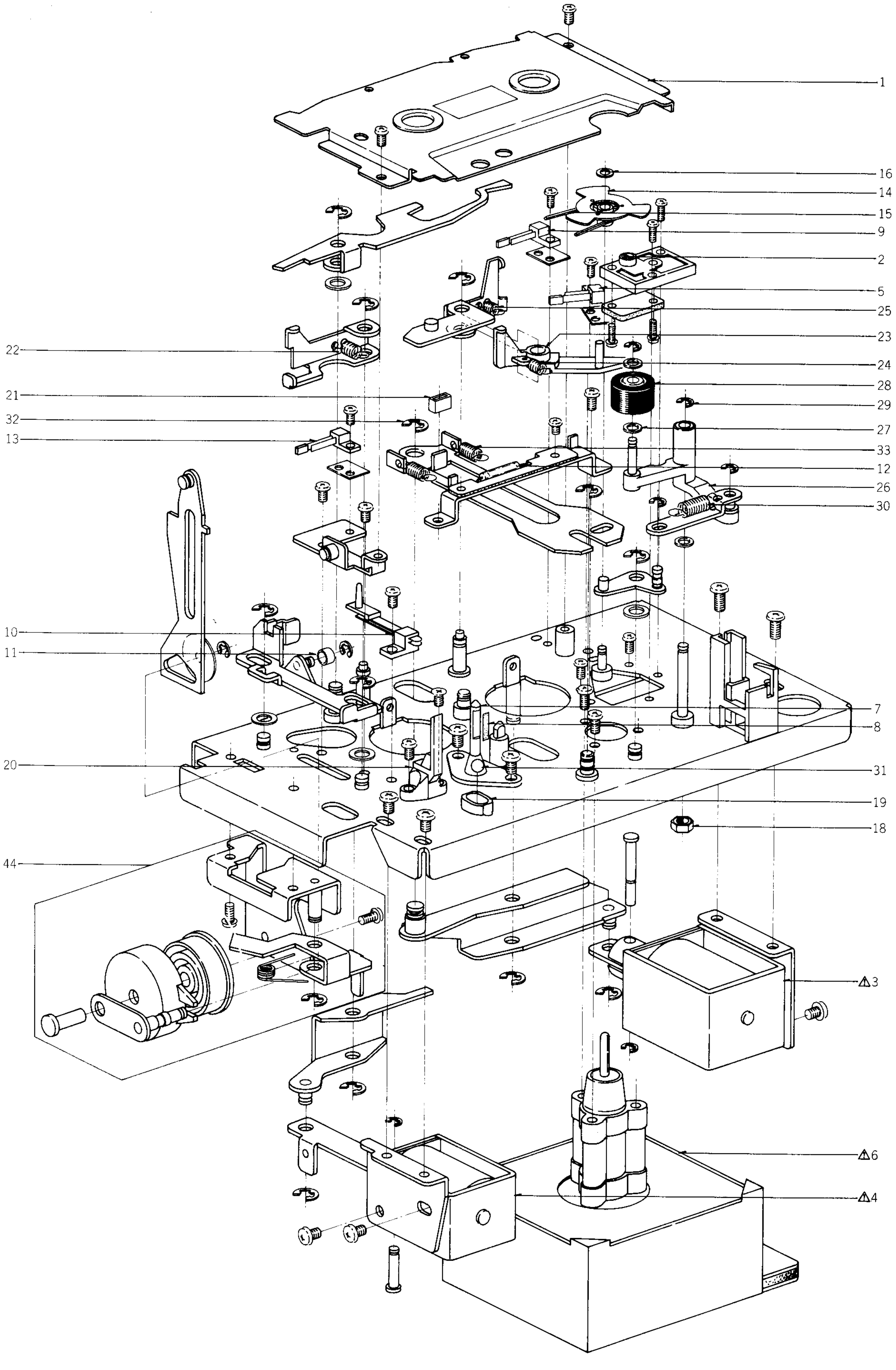
SUB FRAME BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
	REEL MOTOR BLK	
3-1	BMT2008A130A	⚠ REEL MOTOR BLK W/PULLEY GX-F90
	SUB FRAME BLK	
3-2	TC328669	STOPPER RUBBER
3-3	ZW270088	RING E 190SUP CMT
3-4	ZG312943	SP T1-3.2/0.29-11.2 T1-059
3-5	ZG317429	BRAKE SPRING (L)
3-6	MB282104	BRAKE RUBBER
3-7	ZG317431	BRAKE SPRING (R)
3-8	MLB308406	IDLER LEVER PART GXC-715D
3-9	ZG321595	IDLER CLAMP SPRING
3-10	ZW432753	PW31x080x020PBR
3-11	MI321191	IDLER ASSY
3-12	EP200835	⚠ SOLENOID 0730PHT1
3-13	TC317433	TORQUE DRUM
3-14	ZG330077	SP BACK TENSION
3-15	TC318150	TORQUE DRUM (B)
3-16	MTB312122	REEL TABLE PART GXC-715D
3-17	ZS330073	PW21x040x020
3-18	MT305793	REEL CAP
3-19	TCT2018A040A	DAMPER (B) BLK GX-F95
3-20	ZS432843	PAN26x04STL CMT

4. MECHA BLOCK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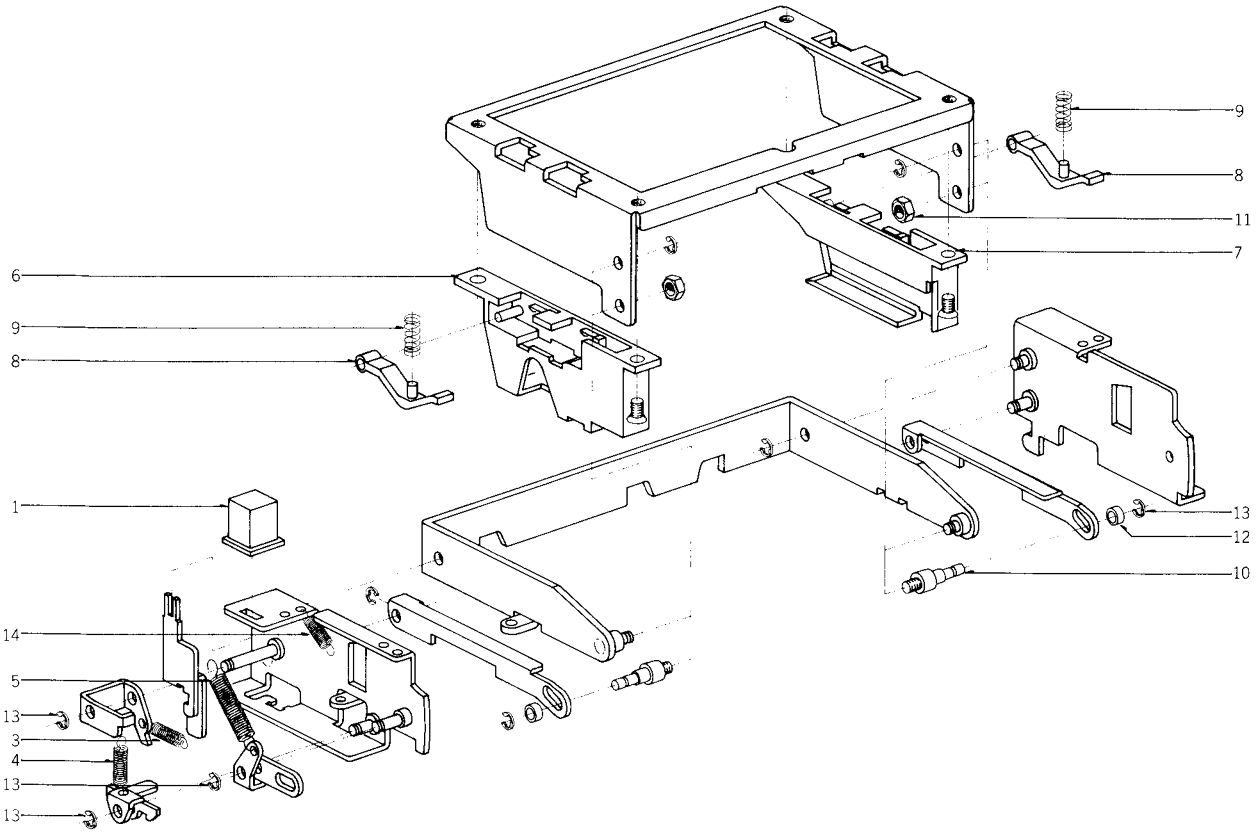
MECHA BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
	DECORATION PLAE BLK	
4-1	BZT2018A420A	DECORATION PLATE BLK GX-F95
	DETECTION PLATE BLK	
4-2	EI324061	PHOTO SENSOR NJL5146E
	PLAY PLUNGER BLK	
4-3	EP200836	⚠ SOLENOID 1240PHT1
	PAUSE PLUNGER BLK	
4-4	EP305795	⚠ SOLENOID 1037THT1
	REC DETECTION SW BLK	
4-5	ES324063	SW LEAF BSW-47P 01-1 NO
	MOTOR BLK	
4-6	BMM3101A020A	⚠ MOTOR BLM-100B
	EH PAT BLK	
4-7	TCT2018A080A	EH PAT BLK GX-F95
4-8	TC315648	PAD
	CHROME DETECTION SW BLK	
4-9	ES324063	SW LEAF BSW-47P 01-1 NO
	METAL DETECTION SW BLK	
4-10	ES317622	SW LEAF BSW-47PB 01-1 NO
	LOCK SLIDE BLK	
4-11	MR310663	ROLLER
	HOUSING LAMP BLK	
4-12	EL317599	PL H LEAD 6.3V 100MA
	PACK DETECTION SW BLK	
4-13	ES305721	SW LEAF MSW-1145 01-1 NO
	MECHA BLK	
4-14	MRB306596	DETECTION PULLEY PART GX-F95
4-15	MB323686	DETECTION BELT
4-16	ZW321437	PUSH WASHER
4-17x	ZW321703	LOCK PLATE WASHER
4-18	ZW273756	N30BRS 1
4-19	MS302191	BALL GUIDE
4-20	TC309145	CASSETTE GUIDE
4-21	MB282104	BRAKE RUBBER
4-22	ZG310531	SP T1-4.0/0.4-12.5 T1-109
4-23	ML306335	METAL DETECTION LEVER
4-24	ZG312943	SP T1-3.2/0.29-11.2 T1-059
4-25	ZG312942	SP T1-3.2/0.29-10.0 T1-058
4-26	MLB318775	PINCH ROLLER LEVER PART GX-F90
4-27	ZW259661	PW30×050×025PSL
4-28	MPB319580	PINCH ROLLER PART GX-F90
4-29	ZW270088	RING E 190SUP CMT
4-30	ZG317414	PINCH ROLLER SPRING
4-31	MV269965	BALL 400STL
4-32	ZW270101	RING E300SUP CMT
4-33	ZG317411	HEAD CLAMP SPRING
4-34	BZT2018A050A	EJECT DAMPER BLK GX-F95

5. EJECTOR BLOCK



EJECTOR BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
5-1	SB316316	BUTTON (B)
5-2x	SB316317	BUTTON (B-BL)
5-3	ZG312944	SP T1-3.2/0.29-12.5 T1-060
5-4	ZG312926	SP T1-3.2/0.2-16.0 T1-043
5-5	ZG313003	SP T1-4.0/0.4-28.0 T1-116
5-6	TC317454	CASSETTE HOLDER (A)
5-7	TC317455	CASSETTE HOLDER (B)
5-8	TC309206	SETTING SHOE
5-9	ZG313165	SP C-3.5/0.32-10.0 C-013
5-10	MH306389	GUIDE PIN
5-11	ZW357658	N26BRS NI3 1
5-12	MR320323	LOCK ROLLER
5-13	ZW270088	RING E 190SUP CMT
5-14	ZG312943	SP T1-3.2/0.29-11.2 T1-059

6. PRE AMP P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
6-1	BAT2018A160A	PRE AMP PC BLK GX-F95(U) (U,C,E,B,S)
6-2	BAT2018A160B	PRE AMP PC BLK GX-F95(J) (J,A)
6-IC1	EI306009	IC LM1111A
6-IC2,3	EI302233	IC TC4051BP
6-IC4	EI310036	IC TC4066BP
6-IC5	EI200573	IC TC4053BP
6-IC6	EI213390	IC NJM4558D
6-IC7	EI306009	IC LM1111A
6-IC8	EI306141	IC LA4170
6-TR1	ET304825	TR 2SC2259 F,G
6-TR2	ET623790	TR 2SA640 E,F
6-TR3	ET391768	TR 2SC458LG C,D
6-TR4	ET639437	TR 2SC945L Q,P
6-TR5	ET554657	TR 2SA733A P,Q
6-TR6	ET304825	TR 2SC2259 F,G
6-TR7	ET623790	TR 2SA640 E,F
6-TR8	ET316171	TR 2SC536K-NP E,F
6-TR9to11	ET554657	TR 2SA733A P,Q
6-TR12	ET304825	TR 2SC2259 F,G
6-TR13	ET623790	TR 2SA640 E,F
6-TR14to19	ET316171	TR 2SC536K-NP E,F
6-TR20to23	ET554657	TR 2SA733A P,Q
6-TR24to26	ET316171	TR 2SC536K-NP E,F
6-TR27	ET307349	⚠ TR 2SD794 P,Q
6-TR28,29	ET316171	TR 2SC536K-NP E,F
6-TR30,31	ET200986	⚠ TR 2SD863-V8 F
6-TR32	ET304825	TR 2SC2259 F,G
6-TR33	ET623790	TR 2SA640 E,F
6-TR34	ET391768	TR 2SC458LG C,D
6-TR35	ET639437	TR 2SC945L Q,P
6-TR36	ET554657	TR 2SA733A P,Q
6-TR37to41	ET316171	TR 2SC536K-NP E,F
6-TR42	ET307349	⚠ TR 2SD794 P,Q
6-TR43	ET316171	TR 2SC536K-NP E,F
6-TR44,45	ET200986	⚠ TR 2SD863-V8 F
6-TR46to49	ET639437	TR 2SC945L Q,P
6-TR50	ET302405	TR FET 2SK150 GR
6-TR51	ET391768	TR 2SC458LG C,D
6-TR52	ET302396	TR 2SA979 F,G
6-TR53	ET391768	TR 2SC458LG C,D
6-TR54	ET639437	TR 2SC945L Q,P
6-TR55	ET554657	TR 2SA733A P,Q
6-TR56	ET639437	TR 2SC945L Q,P
6-TR57	ET320296	⚠ TR 2SD837 P,Q
6-TR58	ET301464	TR FET 2SK68 M,N
6-TR59	ET554657	TR 2SA733A P,Q
6-TR60to63	ET316171	TR 2SC536K-NP E,F
6-TR64,65	ET639437	TR 2SC945L Q,P
6-TR66to68	ET316171	TR 2SC536K-NP E,F
6-D2	ED308952	D GERMA V 1K34A-LR F07
6-D3,4	ED200468	D SILICON V DS448 VB3
6-D5,6	ED308952	D GERMA V 1K34A-LR F07
6-D7	ED200468	D SILICON V DS448 VB3
6-D8	ED560913	D SILICON V 1S2473VE
6-D10	ED560913	D SILICON V 1S2473VE
6-D11to17	ED200468	D SILICON V DS448 VB3
6-D18	ED302269	D ZENER H HZ5 A2
6-D20,21	ED200468	D SILICON V DS448 VB3
6-D22	ED200469	D SILICON H DS448 FA1 F10
6-D23,24	ED200468	D SILICON V DS448 VB3
6-D25	ED306109	D SILICON W03B 100/1.0A
6-D26to29	ED560913	D SILICON V 1S2473VE
6-VC1,2	EC315346	C S-FIX H ECV-1ZW50x32E 5.0-55
6-FR1,2	ER305772	⚠ R FUSE FR25SJ 1/4W 6R8J
6-FR3,4	ER305791	⚠ R FUSE FR25SJ 1/4J 100J
6-FR5to10	ER308896	⚠ R FUSE FR25SJ 1/4W 470J
6-J1	EJ302301	PHONE J HLJ0347-060 2x3P
6-J2	EJ308986	PIN J 1784P1782 P 4P (U,C,E,B,S)
6-J2	EJ308985	JACK PLATE DIN, PIN JACK 4P (J,A)
6-J3	EJ325856	PHONE J 3P HLJ0317-020 6.3
6-SW1	ES315748	SW LEVER 83157 2-08-03S
6-SW2	ES315747	SW LEVER 42388 2-04-02N
6-VR1,2	EV325331	VR ROTARY 16P11x0Q A503 A503
6-VR3	EV315542	R S-FIX H D8 3P 103
6-VR4to6	EV315541	R S-FIX H D8 3P 503
6-VR7,8	EV315542	R S-FIX H D8 3P 103
6-VR9	EV306016	R S-FIX H TM8K(PV) 3P 0.30W 101
6-VR10	EV315541	R S-FIX H D8 3P 503
6-VR11	EV315540	R S-FIX H D8 3P 502
6-VR12	EV319081	VR ROTARY 16P20x1Z B103
6-L1	EO669273	COIL FIX 2 FL5R200 18μH
6-RL1	EP308973	RELAY LEAD LAB2NS 2NO 24V
6-VL1	EO346230	COIL VARI 1 RX-22MH 22MH
6-T1,2	EO200622	COIL OSC1 2330-046 100KHZ
6-SCR1	ED313513	D THYRISTOR SF0R1B41 100V 0.10A
6-FL1	ER328491	FILTER DB D07-003K 100KHZ
6-FL2	ER328490	FILTER DB D07-001K 19KHZ
6-FL3,4	EO315758	COIL TUN 1 100S-431 100KHZ
6-FL5	ER328491	FILTER DB D07-003K 100KHZ
6-C1	EC323260	C EC V F05 NP LP 100M 16DC
6-C3	EC324376	C EC V F05 NP LR 1R0M 50DC
6-C6	EC323260	C EC V F05 NP LP 100M 16DC
6-C8	EC324376	C EC V F05 NP LR 1R0M 50DC
6-C9	EC314991	C STY V F05 CQF09 221J 50DC
6-C29	EC314992	C STY V F05 CQF09 681J 50DC
6-C31	EC314992	C STY V F05 CQF09 681J 50DC
6-C48	EC324402	C STY V SNP CQFS 102J 500DC
6-C49	EC311435	C STY V SNP CQFS 152J 500DC
6-C50	EC324376	C EC V F05 NP LR 1R0M 50DC
6-C53	EC314995	C STY V F05 CQF09 331J 50DC
6-C57	EC306019	C STY V F05 CQ09S 911J 50DC
6-C59	EC302251	C STY V F05 CQF09 451J 50DC
6-C61	EC314990	C STY V F05 CQF09 101J 50DC
6-C63	EC306022	C STY V F05 CQ09S 821J 50DC
6-C64	EC324376	C EC V F05 NP LR 1R0M 50DC
6-C66	EC314991	C STY V F05 CQF09 221J 50DC
6-3	ZW263946	RV NYL40x050

7. SYS. CON. P.C BOARD (CU-5214A) BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
7-1	BAT2018A260A	SYSCON PC BLK GX-F95
7-IC1	EI300812	IC MB8841M (373M)
7-IC2,3	EI302409	IC HD74LS02P
7-IC4to6	EI201549	IC HD7404P
7-IC7	EI213390	IC NJM4558D
7-IC8	EI201550	IC HD7407P
7-TR1to7	ET639437	TR 2SC945L Q,P
7-TR8to12	ET554657	TR 2SA733A P,Q
7-TR13	ET639437	TR 2SC945L Q,P
7-TR14to23	ET554657	TR 2SA733A P,Q
7-TR24to27	ET639437	TR 2SC945L Q,P
7-TR28	ET554657	TR 2SA733A P,Q
7-TR29	ET639437	TR 2SC945L Q,P
7-TR30,31	ET317688	TR 2SB564 K
7-TR32to34	ET302370	TR 2SD471 K,L
7-TR35to37	ET639437	TR 2SC945L Q,P
7-TR38	ET666415	TR 2SB605 K,L
7-TR39	ET666404	TR 2SD571 K,L
7-TR40,41	ET308937	TR 2SC2130 G,H
7-TR42	ET666415	TR 2SB605 K,L
7-TR43	ET666404	TR 2SD571 K,L
7-TR44,45	ET308937	TR 2SC2130 G,H
7-TR46	ET666415	TR 2SB605 K,L
7-TR47	ET666404	TR 2SD571 K,L
7-TR48	ET308937	TR 2SC2130 G,H
7-TR49	ET639437	TR 2SC945L Q,P
7-TR50,51	ET554657	TR 2SA733A P,Q
7-TR52to65	ET639437	TR 2SC945L Q,P
7-TR66	ET316643	TR 2SC536K-NP F,G
7-TR74	ET393568	⚠ TR 2SD234 Y,O 2-10-B
7-D1to6	ED316143	D SILICON H 1S2473HS F10
7-D8to13	ED316143	D SILICON H 1S2473HS F10
7-D14	ED302295	D ZENER H HZ7 C3
7-D15,16	ED316143	D SILICON H 1S2473HS F10
7-D17	ED323979	D SILICON W03B F12 150/1.0A
7-D18	ED322299	D SILICON 10D1FA-2 F12 100/1.0A
7-D19	ED316143	D SILICON H 1S2473HS F10
7-D20	ED323979	D SILICON W03B F12 150/1.0A
7-D21	ED322299	D SILICON 10D1FA-2 F12 100/1.0A
7-D22	ED316143	D SILICON H 1S2473HS F10
7-D23,24	ED322299	D SILICON 10D1FA-2 F12 100/1.0A
7-D25to30	ED316143	D SILICON H 1S2473HS F10
7-D31	ED308953	D GERMA H 1K34A-LH SNP
7-D32	ED316143	D SILICON H 1S2473HS F10
7-D33to36	ED200469	D SILICON H DS448 FA1 F10
7-J1	EJ324276	DIN J TCS4680-01-111 P 8P
7-J2	EJ200618	SOCKET INLET HEC470-630
7-SW1,2	ES201525	SW LEVER SLR523 2-02-03W
7-SW3,4	ES201526	SW LEVER SLR522 2-02-02N
7-VR1	EV523620	R S-FIX H V8K4-1 3P 501
7-R80	ER322265	⚠ R CT P SNP 5W 130J

8. AUTO TUNING P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
8-1	BAT2018A290A	AUTOTUNING PC BLK GX-F95
8-IC1	EI318922	IC MB8841M (424M)
8-IC2	EI213390	IC NJM4558D
8-IC3,4	EI302409	IC HD74LS02P
8-IC5,6	EI300834	IC TC4520BP
8-IC7	EI317652	IC μPC629C
8-IC8	EI310036	IC TC4066BP
8-IC9	EI322993	IC HD74107P
8-IC10	EI302409	IC HD74LS02P
8-IC11	EI319555	IC μPD4049C
8-IC12,13	EI213390	IC NJM4558D
8-IC14,15	EI302233	IC TC4051BP
8-IC16	EI200573	IC TC4053BP
8-TR1to11	ET639437	TR 2SC945L Q,P
8-TR12to15	ET554657	TR 2SA733A P,Q
8-TR16to22	ET639437	TR 2SC945L Q,P
8-TR23to33	ET554657	TR 2SA733A P,Q
8-TR34to37	ET639437	TR 2SC945L Q,P
8-TR38,39	ET554657	TR 2SA733A P,Q
8-TR40to45	ET639437	TR 2SC945L Q,P
8-TR46	ET307349	⚠ TR 2SD794 P,Q
8-TR47	ET320296	⚠ TR 2SD837 P,Q
8-TR48	ET639437	TR 2SC945L Q,P
8-TR49	ET554657	TR 2SA733A P,Q
8-D1,2	ED308952	D GERMA V 1K34A-LR F07
8-D3	ED305704	D ZENER H HZ4 B2
8-D4to9	ED316143	D SILICON H 1S2473HS F10
8-D10	ED323979	D SILICON W03B F12 150/1.0A
8-D11to18	ED316143	D SILICON H 1S2473HS F10
8-D19	ED305706	D ZENER H HZ7 B3
8-D20	ED323979	D SILICON W03B F12 150/1.0A
8-D21,22	ED316143	D SILICON H 1S2473HS F10
8-D23	ED307610	D ZENER H HZ7 A2
8-D24	ED323979	D SILICON W03B F12 150/1.0A
8-D25,26	ED316143	D SILICON H 1S2473HS F10
8-D27	ED323979	D SILICON W03B F12 150/1.0A
8-SW1	ES201527	SW SLIDE SSS212 1-01-02N
8-VR1	EV464196	R S-FIX H V8K4-1 3P 202
8-VR2	EV522797	R S-FIX H V8K4-1 3P 203
8-VR3	EV464220	R S-FIX H V8K4-1 3P 503
8-VR4,5	EV464231	R S-FIX H V8K4-1 3P 104
8-VR6	EV572433	R S-FIX H V8K4-1 3P 504
8-VR7	EV464231	R S-FIX H V8K4-1 3P 104
8-VR8	EV572433	R S-FIX H V8K4-1 3P 504
8-VR9	EV522797	R S-FIX H V8K4-1 3P 203
8-X1	EI318384	OSC X'TAL NC-18C 3.579545MHZ
8-TH1	ED305750	THERMISTER TD5-C350D
8-TH2,3	ED200620	THERMISTER TD5-C320D
8-C30	EC324921	C STY V F05 CQ09S 101J 50DC
8-C49	EC315967	C EC V CUT SM 332M 16DC
8-2	TC302235	P.C BOARD HINGE

9. POWER SUPPLY P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
9-1	BAT2018A210A	POWER PC BLK GX-F95(U) (U,E,B,S)
9-2	BAT2018A210B	POWER PC BLK GX-F95(J)
9-3	BAT2018A210C	POWER PC BLK GX-F95(C) (C,A)
9-IC1	EI325557	IC AP-400-A (TM4504P)
9-IC2	EI304657	IC TC4011BP
9-TR1	ET666404	⚠ TR 2SD571 K,L
9-TR2,3	ET639437	TR 2SC945L Q,P
9-TR4,5	ET554657	TR 2SA733A P,Q
9-TR6	ET666415	⚠ TR 2SB605 K,L
9-TR7	ET639437	⚠ TR 2SC945L Q,P
9-TR8	ET554657	TR 2SA733A P,Q
9-TR9	ET639437	TR 2SC945L Q,P
9-TR10	ET320296	⚠ TR 2SD837 P,Q
9-TR11to15	ET320296	⚠ TR 2SD837 P,Q
9-TR16	ET399846	TR 2SC945L Q
9-TR17	ET307349	TR 2SD794 P,Q
9-TR18	ET639437	TR 2SC945L Q,P
9-TR19	ET318125	⚠ TR 2SB743 P,Q
9-TR20	ET200505	⚠ TR 2SC2603 E,F
9-TR21	ET666415	⚠ TR 2SB605 K,L
9-D1	ED322238	⚠ D SILICON 1B4B41 100/1.0A
9-D2,3	ED306012	D ZENER H HZ7 A3
9-D4	ED306010	D ZENER H HZ6 A2
9-D5	ED306013	D ZENER H HZ7 C1
9-D6	ED300035	D ZENER H HZ6 B3
9-D7	ED560913	D SILICON V 1S2473VE
9-D8	ED326496	⚠ D SILICON 3B4B41 100/3.0A
9-D9	ED306983	D ZENER H HZ12 C3
9-D10	ED306015	D ZENER H HZ24 2
9-D11	ED319463	⚠ D SILICON 4B4B41 100/4.0A
9-DD12,13	ED306109	⚠ D SILICON W03B 100/1.0A
9-D14	ED319167	D ZENER H HZ6 C3
9-D16to18	ED560913	D SILICON V 1S2473VE
9-D19	ED306316	D ZENER H HZ5 C2
9-D20,21	ED200468	⚠ D SILICON V DS448 VB3
9-D22	ED306320	D ZENER H HZ15 2
9-D23	ED306014	D ZENER H HZ9 C3
9-VR1	EV315540	R S-FIX H D8 3P 502
9-VR2	EV306007	R S-FIX H TM8K(PV) 3P 0.30W 203
9-X1	EI201531	OSC X'TAL HC-18/U 6.022/30MHZ
9-SW1	ES310839	⚠ SW PUSH SDG1P-E 01-1 E (U,E,B,S)
9-SW1	ES315159	⚠ SW PUSH SDG1P 01-1 J (J)
9-SW1	ES665875	⚠ SW PUSH SDG1P-J 01-1 UC (C,A)
9-R20	ER306006	⚠ R OMF H FS 2W 222J
9-R38	ER313699	⚠ R OMF H FS 2W 221J
9-C14	EC306321	C EC V SNP NM 472 50DC
9-C15	EC322420	C EC V CUT SM 332M 25DC
9-C21	EC322804	C EC V CUT SM 472M 16DC
9-C27	EC327382	⚠ C MP V 472M 250AC (U,E,B,S)
9-C27	EC320548	⚠ C CE V F 103Z 250AC (J)
9-C27	EC314688	⚠ C CE V FZ 103P 125AC(C,A)

10. BAR METER P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
10-1	EA307003	IND PC
10-IC1	EI325755	IC LC7550
10-D1to16	ED322215	D LED SLP-251D GRM
10-D17to21	ED322247	D LED SLP-151D RED
10-IN1	EM317556	IND FL BG-49 GRAPH

NOTE: Should be order as a pair EA-307003 (IND PC) and EI-325755 (IC LC7550).

11. COUNTER P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
11-IN1	EM201809	IND LE SL-1405-20 CHARACTER

12. INTEGRAL P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
12-TR1,2	ET316171	TR 2SC536K-NP E,F
12-D1	ED560913	D SILICON V 1S2473VE

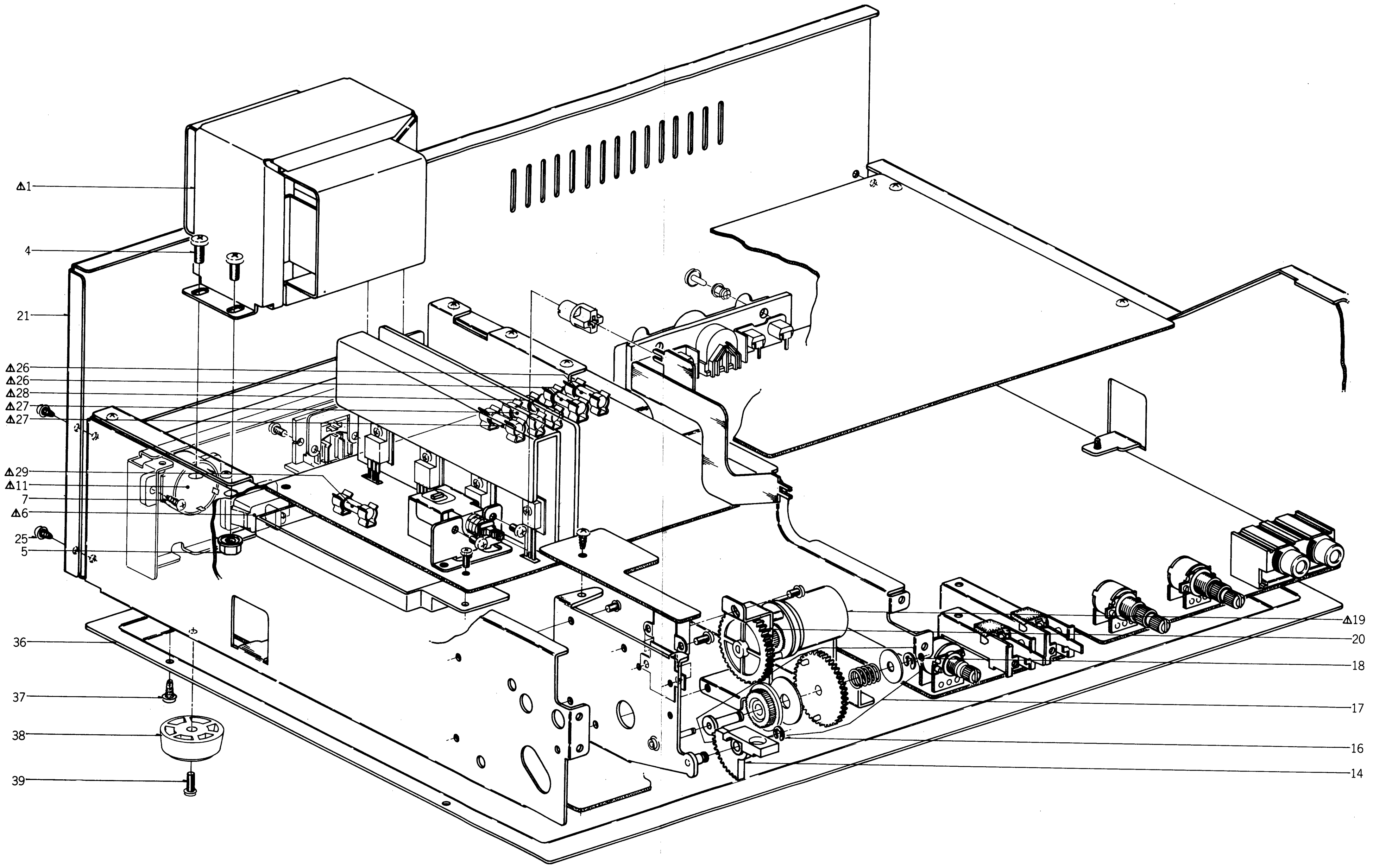
13. MOTOR P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
13-1	BAT2008A090A	MOTOR PC BLK GX-F90

14. DOOR OPEN P.C BOARD BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
14-D1	EI324668	D THYRISTOR AC03BGML 200V 3.00A
14-D2	ED322299	D SILICON 10D1FA-2 F12 100/1.0A
14-SW1	ES201548	SW SNAP SAC-22D 02-2
14-L1	EO669273	COIL FIX 2 FL5R200 18μH

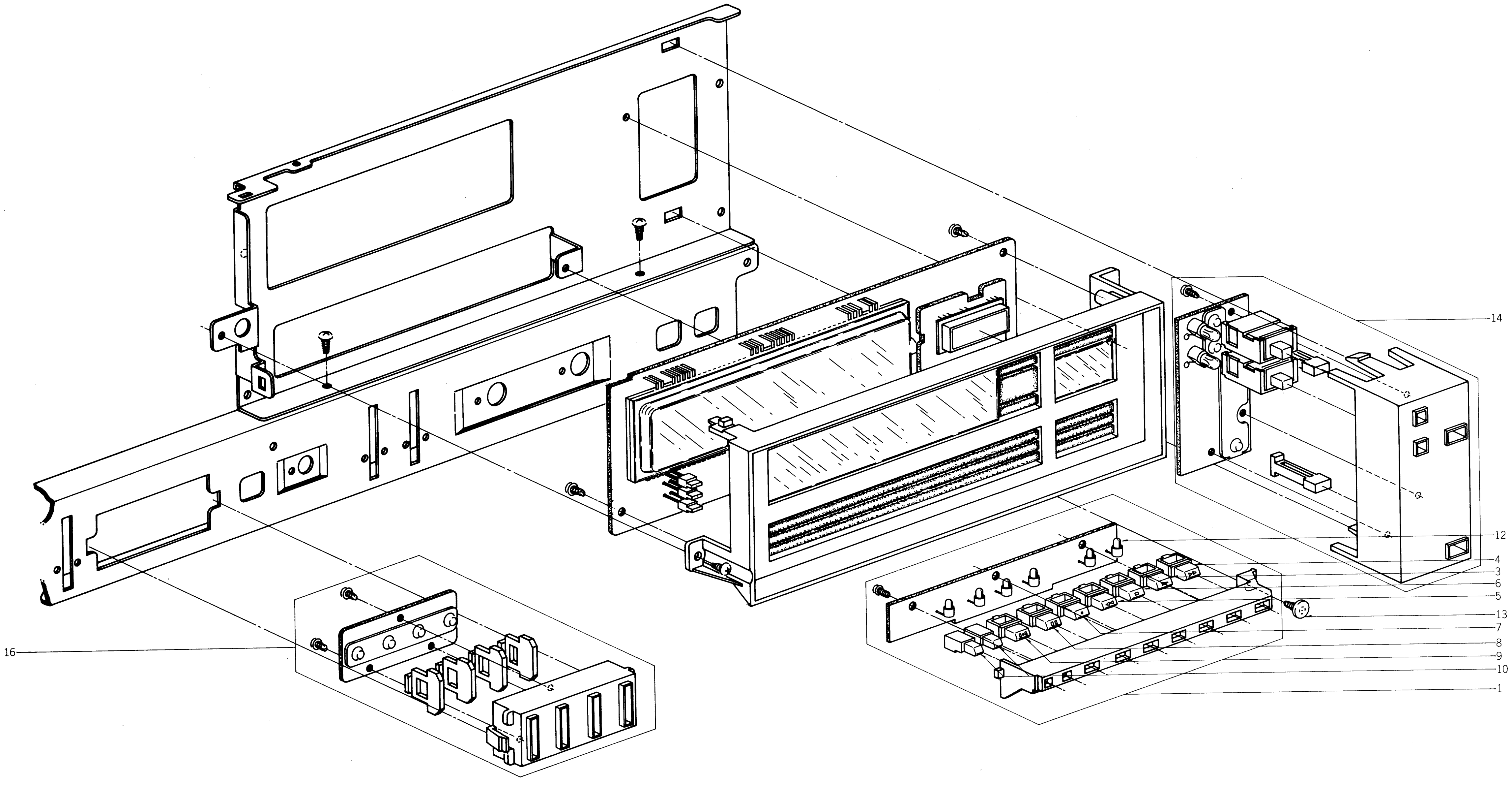
15. ASSEMBLY BLOCK (1)



ASSEMBLY BLOCK (1)

REF. NO.	PARTS NO.	DESCRIPTION
	TRANS BASE BLK	
15-1	BT201246	⚠ TRANS POWER CU2T-1 (U,E,B,S)
15-2x	BT201247	⚠ TRANS POWER CU2T-2 (J)
15-3x	BT201248	⚠ TRANS POWER CU2T-4 (C,A)
15-4	ZS416687	BID40x08STL CMT
15-5	ZW413267	N FRANGE 40STL CMT
15-6	EJ301513	⚠ SOCKET INLET S-I6453 E 2P (U,E,B,S)
15-7	ZS325495	T2BR30x06STL CMT (U,E,B,S)
15-8x	EW306427	⚠ AC CORD 2 CORES KP-211, VFF J (J)
15-9x	EW328245	⚠ AC CORD 2 CORES KP-8/SPT-1 105C UC (C,A)
15-10x	SZ631945	STRAIN RELIEF SR-4N-4 (J,C,A)
15-11	ES305733	⚠ SW SELECTOR HXW0131-260 01-4 (U,E,B,S)
15-12x	EZ329981	VOLTAGE SELECTOR COVER (E,B,S)
15-13x	TA328841	COVER 2P INLET (U,E,B,S)
	DOOR OPEN BLK	
15-14	TC306395A	DOOR HINGE
15-15x	TC306395B	DOOR HINGE (BL)
15-16	ZW357164	RING E230SUP CMT
15-17	TCT2018A370A	MIDDLE GEAR BLK GX-F95
15-18	ZW391397	RING E120SUP CMT
15-19	BM305728	⚠ MOTOR GA608B01
15-20	MR306397	MIDDLE GEAR (A)
	ASSEMBLY BLK	
15-21	SP306559D	REAR PANEL GX-F95 (U,E,B,S)
15-22x	SP306559A	REAR PANEL GX-F95(J)
15-23x	SP306559B	REAR PANEL GX-F95(C)
15-24x	SP306559C	REAR PANEL GX-F95(A)
15-25	ZS447761	T2BR30x06STL BNI
15-26	EF593706	⚠ FUSE SEMKO T 250V 0.50A (U,E,B,S) (F1,2)
15-27	EF623125	⚠ FUSE SEMKO T 250V 2.5A (U,E,B,S) (F3,4)
15-28	EF601301	⚠ FUSE SEMKO T 250V 2A (U,E,B,S) (F5)
15-29	EF623103	⚠ FUSE SEMKO T 250V 1A (U,E,B,S) (F6)
15-30x	EF327103	⚠ FUSE TSC A 250V 0.50A (J) (F1,2)
15-31x	EF306951	⚠ FUSE TSC A 250V 2.5A (J) (F3,4)
15-32x	EF306950	⚠ FUSE TSC A 250V 2A (J) (F5)
15-33x	EF309390	⚠ FUSE TSC 125V 0.50V (C,A) (F1,2)
15-34x	EF306956	⚠ FUSE TSC 125V 2.5A (C,A) (F3,4)
15-35x	EF306954	⚠ FUSE TSC 125V 2A (C,A) (F5)
15-36	SP306544	BOTTOM COVER
15-37	ZS325495	T2BR30x06STL CMT
15-38	SA311742	ROUND FOOT
15-39	ZS306463	ST PAN30x08STL CMT C
15-40x	EW306152	⚠ AC CORD 2 CORES KP-205A/KS-15 UCJ (U)
15-41x	EW315767	⚠ AC CORD 2 CORES KP-419C/KS-15 E (E)
15-42x	EW322400	⚠ AC CORD 2 CORES GTBS-2F/KS-15 B (B)
15-43x	EW322401	⚠ AC CORD 2 CORES KP-560/S-15 S (S)

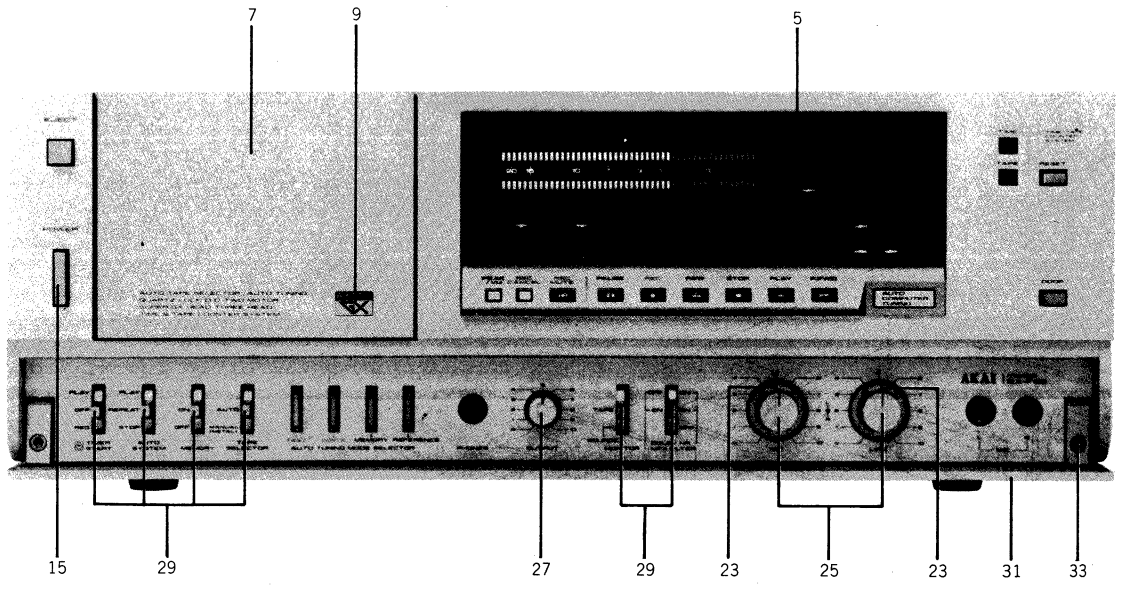
16. ASSEMBLY BLOCK (2)



ASSEMBLY BLOCK (2)

REF. NO.	PARTS NO.	DESCRIPTION
16-1	BKT2008A570A	OPERATION KEY ASSY GX-F90
16-2x	BKT2008A570B	OPERATION KEY ASSY GX-F90-BL
16-3	SB317625	OPERATION BUTTON (PB)
16-4	SB317626	OPERATION BUTTON (FF)
16-5	SB317627	OPERATION BUTTON (REW)
16-6	SB317628	OPERATION BUTTON (STOP)
16-7	SB317629	OPERATION BUTTON (REC)
16-8	SB317630	OPERATION BUTTON (PAUSE)
16-9	SB317631	OPERATION BUTTON (REC MUTE)
16-10	SB317633	OPERATION BUTTON
16-11x	SB317642	OPERATION BUTTON (BL)
16-12	EL317634	LAMP 5V 60MA
16-13	ZS317554	TAP-TIGHT SCREW, GRADUATED 3×5
16-14	ES305734	SW OPERATION J-P5425#01 4P
16-15x	ES305936	SW OPERATION J-P5425#02 4P
16-16	ES305735	SW OPERATION J-P5424#01 4P
16-17x	ES305963	SW OPERATION J-P5424#02 4P
16-18x	ZW241200	RV NYL30×080 BL

17. FINAL ASSEMBLY BLOCK



FINAL ASSEMBLY BLOCK

REF. NO.	PARTS NO.	DESCRIPTION
	FRONT PANEL BLK	
17-1	BDT2018A390A	FRONT PANEL BLK GX-F95(U) (U,C,E,B,S)
17-2x	BDT2018A390B	FRONT PANEL BLK GX-F95(J)(J,A)
17-3x	BDT2018A390C	FRONT PANEL BLK GX-F95-BL(U) (U,C,E,B,S)
17-4x	BDT2018A390D	FRONT PANEL BLK GX-F95-BL(J) (J,A)
17-5	SZ306578	METER WINDOW
	LID PANEL (A) BLK	
17-6x	IC306545A	LID HOLD PLATE (A)
17-7	SP306400A	LID PANEL (A)
17-8x	SP306400B	LID PANEL (A)-BL
17-9	SM315737	SUPER GX NAME PLATE
	LID PANEL (B) BLK	
17-10x	TC306545B	LID HOLD PLATE (B)
17-11x	TC306591	LID GLASS
17-12x	ZS315686	DECORATION SCREW (BL)
	HINGE PANEL BLK	
17-13x	TC306395A	DOOR HINGE
17-14x	TC306395B	DOOR HINGE (BL)

REF. NO.	PARTS NO.	DESCRIPTION
	FINAL ASSEMBLY BLK	
17-15	SB315697	BUTTON (B)
17-16x	SB315698	BUTTON (B-BL)
17-17x	SP306540A	UPPER COVER
17-18x	SP306540B	UPPER COVER (BL)
17-19x	SP306540C	UPPER COVER (AAL)
17-20x	ZS315878	XST BID40x08STL NI3
17-21x	ZS310588	XST BID40x08STL BNI (A,BL)
17-22x	ZS447761	T2BR30x06STL BNI
17-23	SK329031	DOUBLE KNOB (LOWER-A)
17-24x	SK329030	DOUBLE KNOB (LOWER-BL)
17-25	SK306765	DOUBLE KNOB (UPPER-B)
17-26x	SK306771	DOUBLE KNOB (UPPER-B)-BL
17-27	SK306935	KNOB (F)
17-28x	SK306964	KNOB (F)-BL
17-29	SK306902	LEVER KNOB (B)
17-30x	SK329034	LEVER KNOB (BL)
17-31	BZB306547A	DOOR PART GX-F95
17-32x	BZB306547B	DOOR PART GX-F95-BL
17-33	ZS613901	PANEL SCREW
17-34x	ZS306435	PANEL SCREW (C) (BL)
17-35x	ZW305013	RV POP32

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PARTS NO.	REF. NO.	PARTS NO.	REF. NO.	PARTS NO.	REF. NO.	PARTS NO.	REF. NO.
BAT2008A090A	13-1	ED308952	6-D5,6	EJ302301	6-J1	ET391768	6-TR34
BAT2018A160A	6-1	ED308952	8-D1,2	EJ308985	6-J2	ET391768	6-TR51
BAT2018A160B	6-2	ED308953	7-D31	EJ308986	6-J2	ET391768	6-TR53
BAT2018A210A	9-1	ED313513	6-SCR1	EJ324276	7-J1	ET393568	7-TR74
BAT2018A210B	9-2	ED316143	7-D1to6	EJ325856	6-J3	ET399846	9-TR16
BAT2018A210C	9-3	ED316143	7-D8to13	EL317599	4-12	ET554657	6-TR5
BAT2018A260A	7-1	ED316143	7-D15,16	EL317634	16-12	ET554657	6-TR9to11
BAT2018A290A	8-1	ED316143	7-D19	EM201809	11-IN1	ET554657	6-TR20to23
BDT2018A390A	17-1	ED316143	7-D22	EM317556	10-IN1	ET554657	6-TR36
BDT2018A390B	17-2x	ED316143	7-D25to30	EO200622	6-T1,2	ET554657	6-TR55
BDT2018A390C	17-3x	ED316143	7-D32	EO315758	6-FL3,4	ET554657	6-TR59
BDT2018A390D	17-4x	ED316143	8-D4to9	EO346230	6-VL1	ET554657	7-TR8to12
BHT2018A440A	2-1x	ED316143	8-D11to18	EO669273	6-L1	ET554657	7-TR14to23
BKT2008A570A	16-1	ED316143	8-D21,22	EO669273	14-L1	ET554657	7-TR28
BKT2008A570B	16-2x	ED316143	8-D25,26	EP200835	3-12	ET554657	7-TR50,51
BMM3101A020A	4-6	ED319167	9-D14	EP200836	4-3	ET554657	8-TR12to15
BMT2008A130A	3-1	ED319463	9-D11	EP305795	4-4	ET554657	8-TR23to33
BM305728	15-19	ED322215	10-D1to16	EP308973	6-RL1	ET554657	8-TR38,39
BT201246	15-1	ED322238	9-D1	ER305772	6-FR1,2	ET554657	8-TR49
BT201247	15-2x	ED322247	10-D17to21	ER305791	6-FR3,4	ET554657	9-TR4,5
BT201248	15-3x	ED322299	7-D18	ER306006	9-R20	ET554657	9-TR8
BZB306547A	17-31	ED322299	7-D21	ER308896	6-FR5to10	ET623790	6-TR2
BZB306547B	17-32x	ED322299	7-D23,24	ER313699	9-R38	ET623790	6-TR7
BZT2018A050A	4-34	ED322299	14-D2	ER322265	7-R80	ET623790	6-TR13
BZT2018A420A	4-1	ED323979	7-D17	ER328490	6-FL2	ET623790	6-TR33
EA307003	10-1	ED323979	7-D20	ER328491	6-FL1	ET639437	6-TR4
EA669510	2-12x	ED323979	8-D10	ER328491	6-FL5	ET639437	6-TR35
EC302251	6-C59	ED323979	8-D20	ES201525	7-SW1,2	ET639437	6-TR46to49
EC306019	6-C57	ED323979	8-D24	ES201526	7-SW3,4	ET639437	6-TR54
EC306022	6-C63	ED323979	8-D27	ES201527	8-SW1	ET639437	6-TR56
EC306321	9-C14	ED326496	9-D8	ES201548	14-SW1	ET639437	6-TR64,65
EC311435	6-C49	ED560913	6-D8	ES305721	4-13	ET639437	7-TR1to7
EC314688	9-C27	ED560913	6-D10	ES305733	15-11	ET639437	7-TR13
EC314990	6-C61	ED560913	6-D26to29	ES305734	16-14	ET639437	7-TR24to27
EC314991	6-C9	ED560913	9-D7	ES305735	16-16	ET639437	7-TR29
EC314991	6-C66	ED560913	9-D16to18	ES305936	16-15x	ET639437	7-TR35to37
EC314992	6-C29	ED560913	12-D1	ES305963	16-17x	ET639437	7-TR49
EC314992	6-C31	EF306950	15-32x	ES310839	9-SW1	ET639437	7-TR52to65
EC314995	6-C53	EF306951	15-31x	ES315159	9-SW1	ET639437	8-TR1to11
EC315346	6-VC1,2	EF306954	15-35x	ES315747	6-SW2	ET639437	8-TR16to22
EC315967	8-C49	EF306956	15-34x	ES315748	6-SW1	ET639437	8-TR34to37
EC320548	9-C27	EF309390	15-33x	ES317622	4-10	ET639437	8-TR40to45
EC322420	9-C15	EF327103	15-30x	ES324063	4-5	ET639437	8-TR48
EC322804	9-C21	EF593706	15-26	ES324063	4-9	ET639437	9-TR2,3
EC323260	6-C1	EF601301	15-28	ES665875	9-SW1	ET639437	9-TR7
EC323260	6-C6	EF623103	15-29	ET200505	9-TR20	ET639437	9-TR9
EC324376	6-C3	EF623125	15-27	ET200986	6-TR30,31	ET639437	9-TR18
EC324376	6-C8	EI200573	6-IC5	ET200986	6-TR44,45	ET666404	7-TR39
EC324376	6-C50	EI200573	8-IC16	ET301464	6-TR58	ET666404	7-TR43
EC324376	6-C64	EI201531	9-X1	ET302370	7-TR32to34	ET666404	7-TR47
EC324402	6-C48	EI201549	7-IC4to6	ET302396	6-TR52	ET666404	9-TR1
EC324921	8-C30	EI201550	7-IC8	ET302405	6-TR50	ET666415	7-TR38
EC327382	9-C27	EI213390	6-IC6	ET304825	6-TR1	ET666415	7-TR42
ED200468	6-D3,4	EI213390	7-IC7	ET304825	6-TR6	ET666415	7-TR46
ED200468	6-D7	EI213390	8-IC2	ET304825	6-TR12	ET666415	9-TR6
ED200468	6-D11to17	EI213390	8-IC12,13	ET304825	6-TR32	ET666415	9-TR21
ED200468	6-D20,21	EI300812	7-IC1	ET307349	6-TR27	EV306007	9-VR2
ED200468	6-D23,24	EI300834	8-IC5,6	ET307349	6-TR42	EV306016	6-VR9
ED200468	9-D20,21	EI302233	6-IC2,3	ET307349	8-TR46	EV315540	6-VR11
ED200469	6-D22	EI302233	8-IC14,15	ET307349	9-TR17	EV315540	9-VR1
ED200469	7-D33to36	EI302409	7-IC2,3	ET308937	7-TR40,41	EV315541	6-VR4to6
ED200620	8-TH2,3	EI302409	8-IC3,4	ET308937	7-TR44,45	EV315541	6-VR10
ED300035	9-D6	EI302409	8-IC10	ET308937	7-TR48	EV315542	6-VR3
ED302269	6-D18	EI304657	9-IC2	ET316171	6-TR8	EV315542	6-VR7,8
ED302295	7-D14	EI306009	6-IC1	ET316171	6-TR14to19	EV319081	6-VR12
ED305704	8-D3	EI306009	6-IC7	ET316171	6-TR24to26	EV325331	6-VR1,2
ED305706	8-D19	EI306141	6-IC8	ET316171	6-TR28,29	EV464196	8-VR1
ED305750	8-TH1	EI310036	6-IC4	ET316171	6-TR37to41	EV464220	8-VR3
ED306010	9-D4	EI310036	8-IC8	ET316171	6-TR43	EV464231	8-VR4,5
ED306012	9-D2,3	EI317652	8-IC7	ET316171	6-TR60to63	EV464231	8-VR7
ED306013	9-D5	EI318384	8-X1	ET316171	6-TR66to68	EV522797	8-VR2
ED306014	9-D23	EI318922	8-IC1	ET316171	12-TR1,2	EV522797	8-VR9
ED306015	9-D10	EI319555	8-IC11	ET316643	7-TR66	EV523620	7-VR1
ED306109	6-D25	EI322993	8-IC9	ET317688	7-TR30,31	EV572433	8-VR6
ED306109	9-D12,13	EI324061	4-2	ET318125	9-TR19	EV572433	8-VR8
ED306316	9-D19	EI324668	14-D1	ET320296	6-TR57	EW306152	15-40x
ED306320	9-D22	EI325557	9-IC1	ET320296	8-TR47	EW306427	15-8x
ED306983	9-D9	EI325755	10-IC1	ET320296	9-TR10	EW315767	15-41x
ED307610	8-D23	EJ200618	7-J2	ET320296	9-TR11to15	EW322400	15-42x
ED308952	6-D2	EJ301513	15-6	ET391768	6-TR3	EW322401	15-43x

INDEX

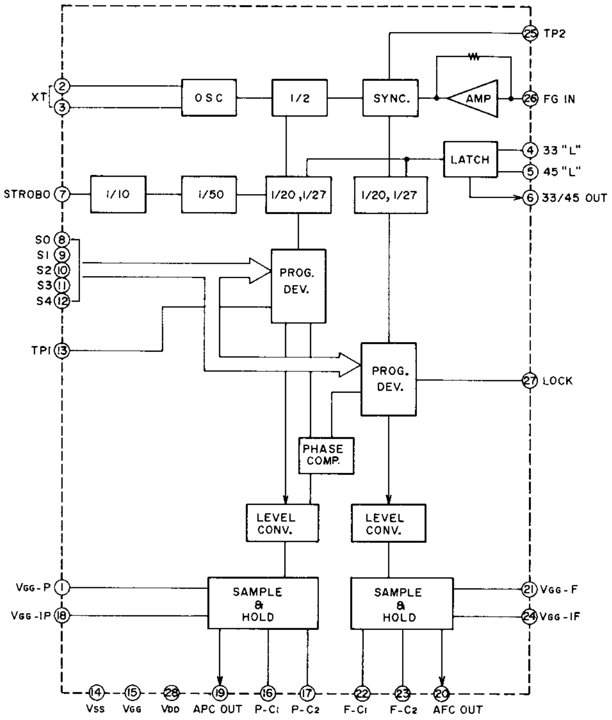
PARTS NO.	REF. NO.
EW328245	15-9x
EZ329981	15-12x
HE315742	2-6
HPH2402A010A	2-11
HZ309128	2-3
HZ317352	2-10
HZ317355	2-14
MB282104	3-6
MB282104	4-21
MB323686	4-15
MH306389	5-10
MI321191	3-11
MLB308406	3-8
MLB318775	4-26
ML306335	4-23
MPB319580	4-28
MRB306596	4-14
MR306397	15-20
MR310663	4-11
MR320323	5-12
MS302191	4-19
MTB312122	3-16
MT305793	3-18
MV269965	4-31
SA311742	15-38
SB315697	17-15
SB315698	17-16x
SB316316	5-1
SB316317	5-2x
SB317625	16-3
SB317626	16-4
SB317627	16-5
SB317628	16-6
SB317629	16-7
SB317630	16-8
SB317631	16-9
SB317633	16-10
SB317642	16-11x
SK306765	17-25
SK306771	17-26x
SK306902	17-29
SK306935	17-27
SK306964	17-28x
SK329030	17-24x
SK329031	17-23
SK329034	17-30x
SM315737	17-9
SP306400A	17-7
SP306400B	17-8x
SP306540A	17-17x
SP306540B	17-18x
SP306540	17-19x
SP306544	15-36
SP306559A	15-22x
SP306559B	15-23x
SP306559C	15-24x
SP306559D	15-21
SZ306578	17-5
SZ317672	2-21
SZ631945	15-10x
TA328841	15-13x
TCT2018A040A	3-19
TCT2018A080A	4-7
TCT2018A370A	15-17
TC302235	8-2
TC306395A	15-14
TC306395A	17-13x
TC306395B	15-15x
TC306395B	17-14x
TC306545A	17-6x
TC306545B	17-10x
TC306591	17-11x
TC309145	4-20
TC309206	5-8
TC315648	4-8
TC317433	3-13
TC317454	5-6
TC317455	5-7
TC318150	3-15
TC328669	3-2
ZG289236	2-2
ZG310531	4-22
ZG312926	5-4
ZG312942	4-25
ZG312943	3-4
ZG312943	4-24
ZG312943	5-14
ZG312944	5-3
ZG312946	2-9
ZG312996	2-20
ZG313003	5-5
ZG313165	5-9
ZG313187	2-5
ZG317411	4-33
ZG317414	4-30
ZG317429	3-5
ZG317431	3-7
ZG321595	3-9
ZG330077	3-14
ZG465636	2-17
ZS300626	2-13
ZS306435	17-34x
ZS306463	15-39
ZS310588	17-21x
ZS315686	17-12x
ZS315878	17-20x
ZS317554	16-13
ZS325495	15-37
ZS325495	15-7
ZS330073	3-17
ZS356804	2-15
ZS416687	15-4
ZS417227	2-7
ZS419782	2-19
ZS432843	3-20
ZS447761	15-25
ZS447761	17-22x
ZS462947	2-16
ZS590804	2-18
ZS608174	2-22
ZS613901	17-33
ZW241200	16-18x
ZW259661	4-27
ZW263946	6-3
ZW270088	3-3
ZW270088	4-29
ZW270088	5-13
ZW270101	4-32
ZW270123	2-8
ZW273756	4-18
ZW305013	17-35x
ZW321437	4-16
ZW321703	4-17x
ZW357164	15-16
ZW357658	5-11
ZW391397	15-18
ZW413267	15-5
ZW432753	3-10
ZW591265	2-4

SECTION 3

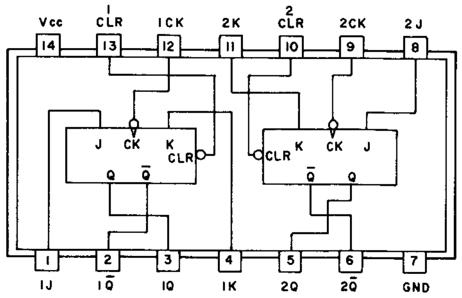
SCHEMATIC DIAGRAM

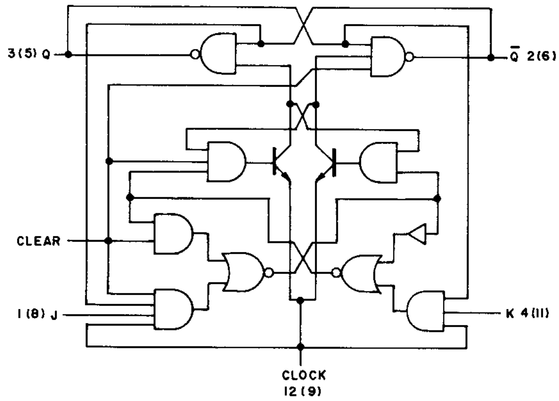
1. SCHEMATIC DIAGRAM OF ICs
2. GX-F95 NO. 3-1 1620842A POWER & SYSCON SCHEMATIC DIAGRAM
3. GX-F95 NO. 3-2 1620843A TUNING SCHEMATIC DIAGRAM
4. GX-F95 NO. 3-3 1620844A AMPLIFIER SCHEMATIC DIAGRAM

AP-400A

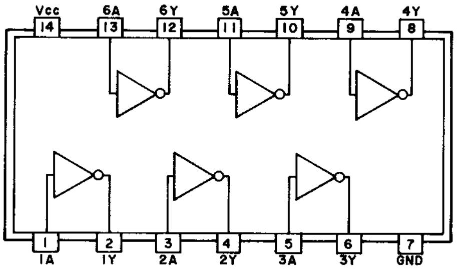

TP2
25
XT
2
3
OSC
1/2
SYNC.
AMP
26 FG IN
LATCH
4 33 "L"
5 45 "L"
6 33/45 OUT
STROBO 7
1/10
1/50
1/20, 1/27
1/20, 1/27
S0 8
S1 9
S2 10
S3 11
S4 12
PROG. DEV.
TP1 13
PROG. DEV.
27 LOCK
PHASE COMP.
LEVEL CONV.
LEVEL CONV.
VGG-P 1
VGG-IP 18
SAMPLE & HOLD
SAMPLE & HOLD
21 VGG-F
24 VGG-IF
14 VSS
15 VGG
28 VDD
19 APC OUT
16 P-C1
17 P-C2
22 F-C1
23 F-C2
20 AFC OUT

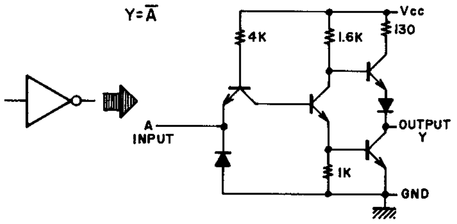
HD74107P


Vcc 14
1 CLR 13
1CK 12
2K 11
2 CLR 10
2CK 9
2J 8
J CK K CLR Q Q̄
CLR K CK J Q̄ Q
1 1J
2 1Q̄
3 1Q
4 1K
5 2Q
6 2Q̄
7 GND

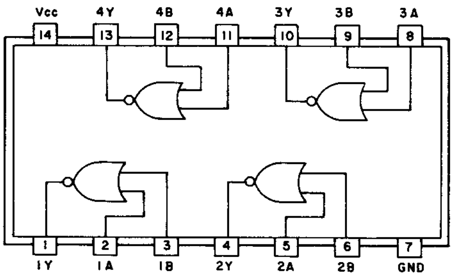

3(5) Q
Q̄ 2(6)
CLEAR
1(8) J
K 4(11)
CLOCK 12(9)

HD7404P

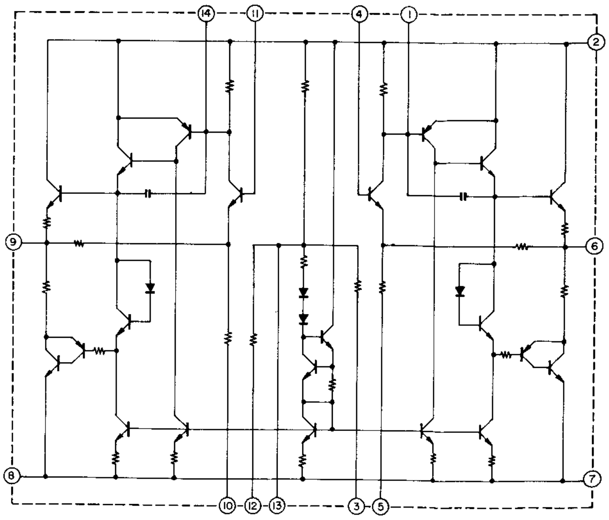

Vcc 14
6A 13
6Y 12
5A 11
5Y 10
4A 9
4Y 8
1 1A
2 1Y
3 2A
4 2Y
5 3A
6 3Y
7 GND


Y=Ā
Vcc
4K
1.6K
130
A INPUT
OUTPUT Y
1K
GND

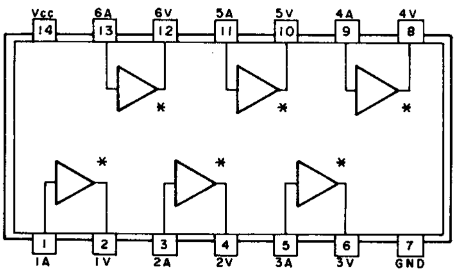
HD74LS02P


Vcc 14
4Y 13
4B 12
4A 11
3Y 10
3B 9
3A 8
1 1Y
2 1A
3 1B
4 2Y
5 2A
6 2B
7 GND

LA4170

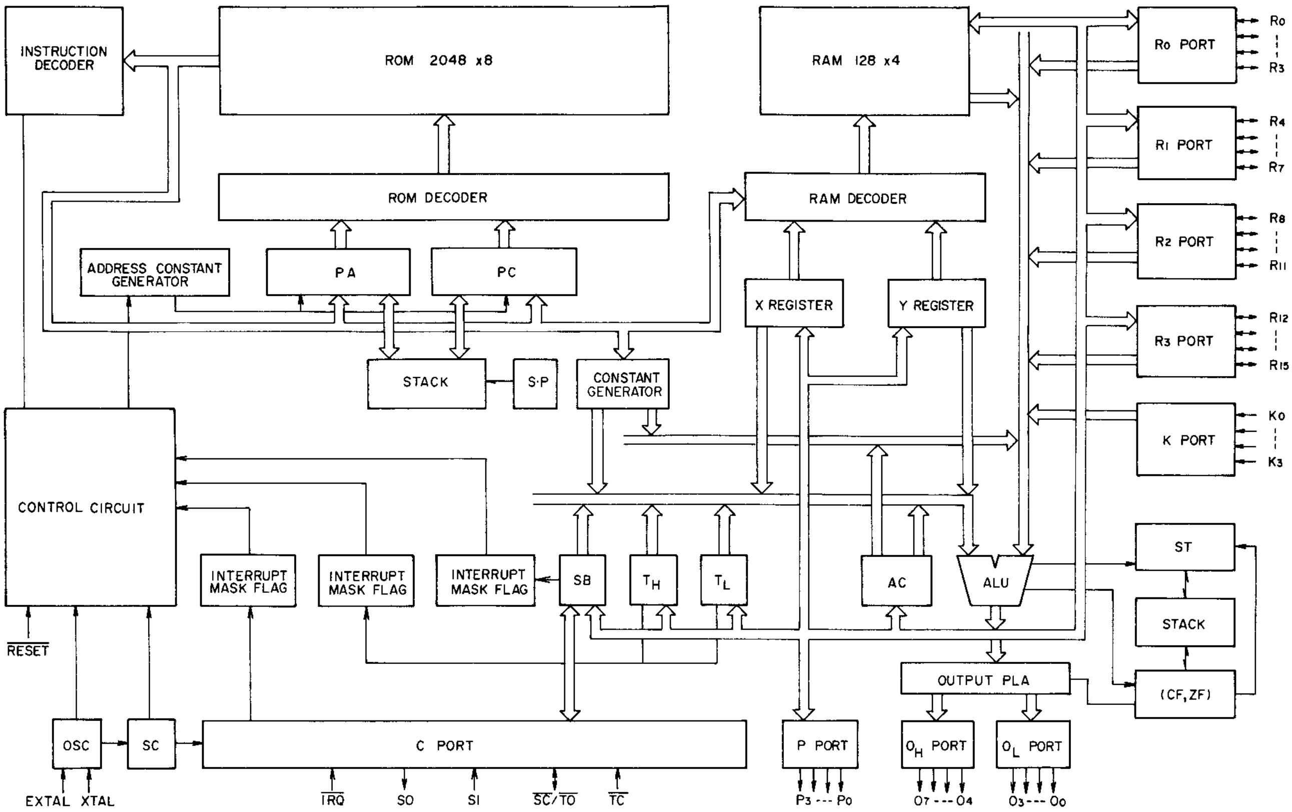

14
11
4
1
2
9
6
8
7
10
12
13
3
5

HD7407P

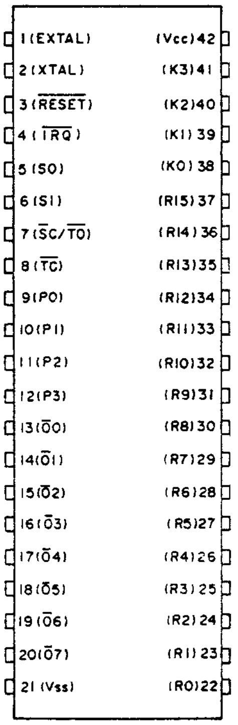

Vcc 14
6A 13
6V 12
5A 11
5V 10
4A 9
4V 8
1 1A
2 1V
3 2A
4 2V
5 3A
6 3V
7 GND

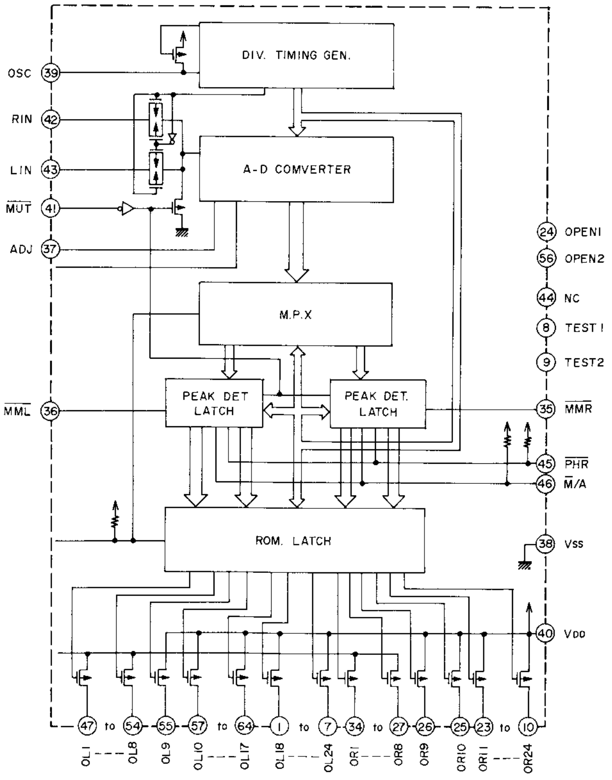
* OPEN COLLECTOR

MB8841M-373M/-424M

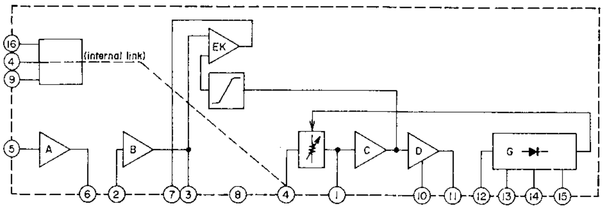

INSTRUCTION DECODER
ROM 2048 x8
RAM 128 x4
R0 PORT
R0
R3
R1 PORT
R4
R7
R2 PORT
R8
R11
R3 PORT
R12
R15
K PORT
K0
K3
ROM DECODER
RAM DECODER
ADDRESS CONSTANT GENERATOR
PA
PC
X REGISTER
Y REGISTER
STACK
S·P
CONSTANT GENERATOR
CONTROL CIRCUIT
INTERRUPT MASK FLAG
INTERRUPT MASK FLAG
INTERRUPT MASK FLAG
SB
T_H
T_L
AC
ALU
ST
STACK
(CF,ZF)
OUTPUT PLA
RESET
OSC
SC
C PORT
P PORT
O_H PORT
O_L PORT
EXTAL
XTAL
IRQ
SO
SI
SC/TO
TC
P3 --- P0
O7 --- O4
O3 --- O0

LC7550

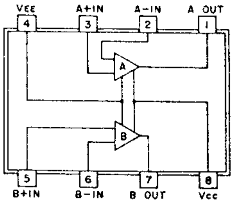

1 (EXTAL)
2 (XTAL)
3 (RESET)
4 (IRQ)
5 (SO)
6 (SI)
7 (SC/TO)
8 (TC)
9 (P0)
10 (P1)
11 (P2)
12 (P3)
13 (O0)
14 (O1)
15 (O2)
16 (O3)
17 (O4)
18 (O5)
19 (O6)
20 (O7)
21 (Vss)
(Vcc) 42
(K3) 41
(K2) 40
(K1) 39
(K0) 38
(R15) 37
(R14) 36
(R13) 35
(R12) 34
(R11) 33
(R10) 32
(R9) 31
(R8) 30
(R7) 29
(R6) 28
(R5) 27
(R4) 26
(R3) 25
(R2) 24
(R1) 23
(R0) 22


DIV. TIMING GEN.
OSC 39
RIN 42
LIN 43
MUT 41
ADJ 37
A-D COMVERTER
M.P.X
PEAK DET LATCH
PEAK DET. LATCH
MML 36
ROM. LATCH
24 OPEN1
56 OPEN2
44 NC
8 TEST1
9 TEST2
35 MMR
45 PHR
46 M/A
38 Vss
40 VDD
47 to 54
55
57 to 64
1 to 7
34 to 27
26
25
23 to 10
OL1 --- OL8
OL9
OL10 --- OL17
OL18 --- OL24
OR1 --- OR8
OR9
OR10
OR11 --- OR24

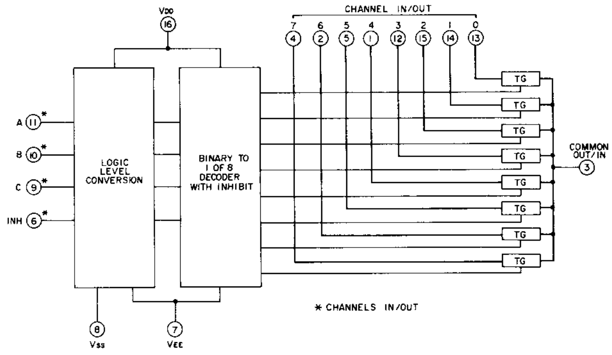
LM-1111A


(internal link)
EK
A
B
C
D
G
16
4
9
5
6
2
7
3
8
4
1
10
11
12
13
14
15

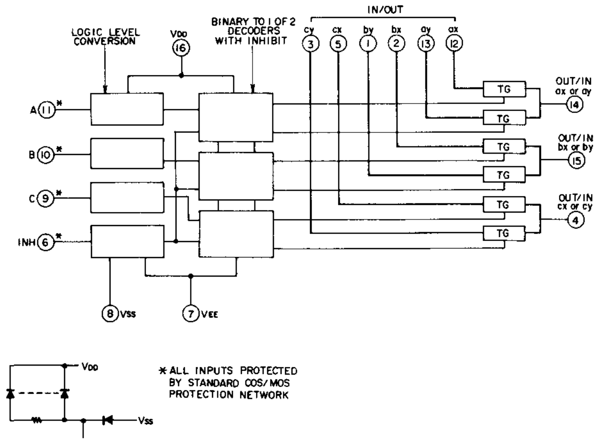
NJM4558D


VEE
A+IN
A−IN
A OUT
4
3
2
1
A
B
5
6
7
8
B+IN
B−IN
B OUT
Vcc

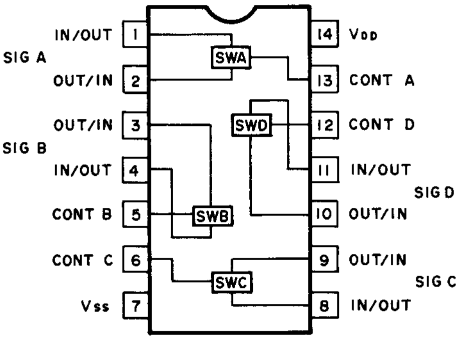
TC4051BP


VDD
16
CHANNEL IN/OUT
7 6 5 4 3 2 1 0
4 2 5 1 12 15 14 13
A 11*
B 10*
C 9*
INH 6*
LOGIC LEVEL CONVERSION
BINARY TO 1 OF 8 DECODER WITH INHIBIT
TG
COMMON OUT/IN
3
8
Vss
7
VEE
* CHANNELS IN/OUT

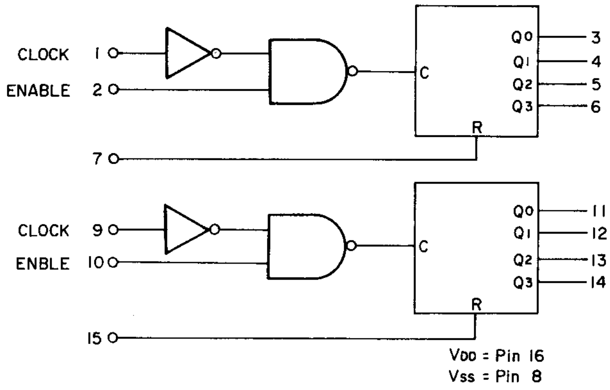
TC4053BP


LOGIC LEVEL CONVERSION
VDD
16
BINARY TO 1 OF 2 DECODERS WITH INHIBIT
IN/OUT
cy cx by bx ay ax
3 5 1 2 13 12
A 11*
B 10*
C 9*
INH 6*
TG
OUT/IN ax or ay 14
OUT/IN bx or by 15
OUT/IN cx or cy 4
8 VSS
7 VEE
VDD
VSS
* ALL INPUTS PROTECTED BY STANDARD COS/MOS PROTECTION NETWORK

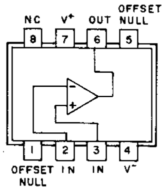
TC4066BP

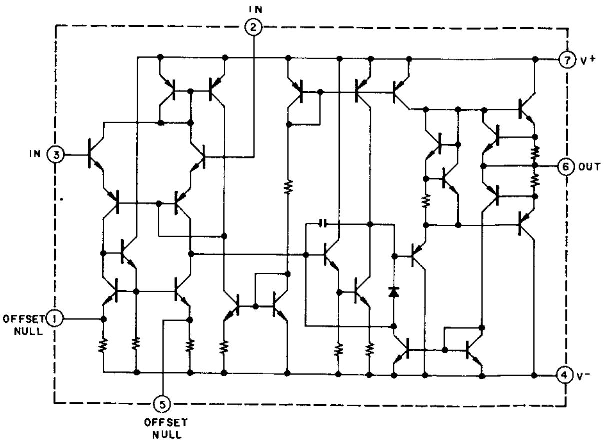

SIG A
IN/OUT 1
OUT/IN 2
SIG B
OUT/IN 3
IN/OUT 4
CONT B 5
CONT C 6
Vss 7
14 VDD
13 CONT A
12 CONT D
11 IN/OUT
SIG D
10 OUT/IN
9 OUT/IN
SIG C
8 IN/OUT
SWA
SWB
SWC
SWD

TC4520BP

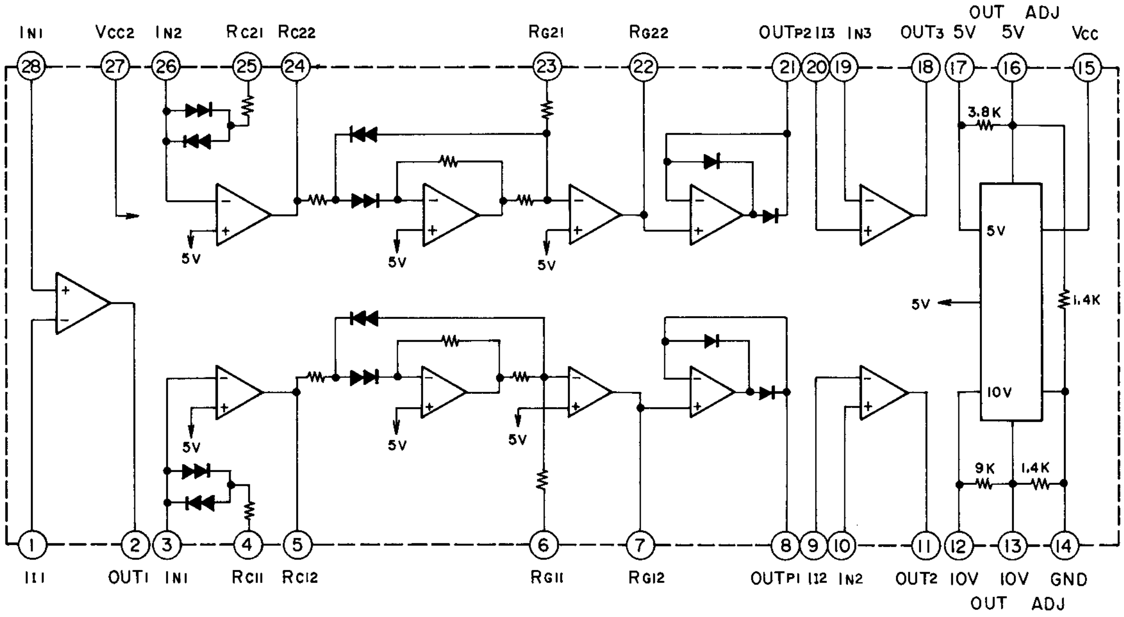

CLOCK 1
ENABLE 2
7
C
R
Q0 3
Q1 4
Q2 5
Q3 6
CLOCK 9
ENBLE 10
15
Q0 11
Q1 12
Q2 13
Q3 14
VDD = Pin 16
Vss = Pin 8

μPC741C

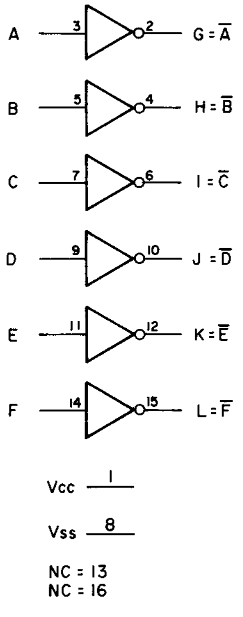

NC
V+
OUT
OFFSET NULL
8 7 6 5
1 2 3 4
OFFSET NULL
IN
IN
V−

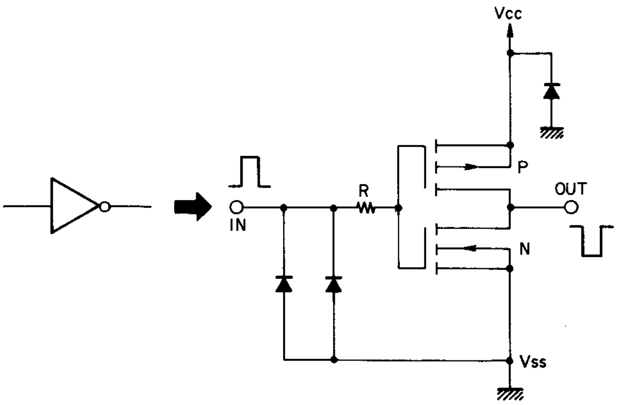

IN
2
7 V+
IN 3
6 OUT
OFFSET NULL 1
4 V−
5
OFFSET NULL

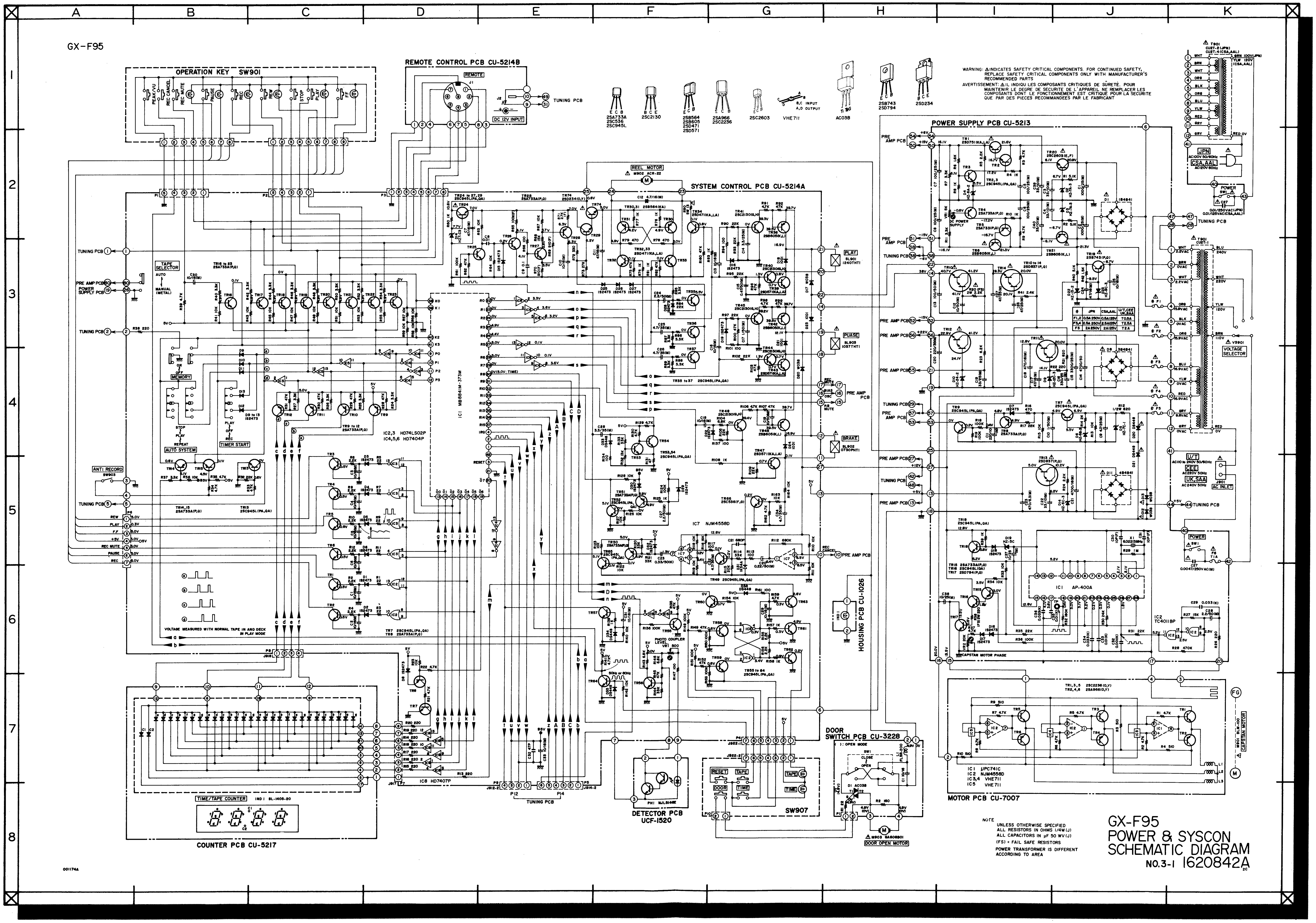
μPC629C


IN1
Vcc2
IN2
Rc21
Rc22
RG21
RG22
OUTP2
I13
IN3
OUT3
OUT 5V
ADJ 5V
Vcc
28
27
26
25
24
23
22
21
20
19
18
17
16
15
3.8K
5V
5V
5V
5V
5V
5V
5V
5V
5V
10V
1.4K
9K
1.4K
1
2
3
4
5
6
7
8
9
10
11
12
13
14
I11
OUT1
IN1
Rc11
Rc12
RG11
RG12
OUTP1
I12
IN2
OUT2
10V OUT
10V ADJ
GND

μPD4049C


A
3
2
G = $\bar{A}$
B
5
4
H = $\bar{B}$
C
7
6
I = $\bar{C}$
D
9
10
J = $\bar{D}$
E
11
12
K = $\bar{E}$
F
14
15
L = $\bar{F}$
Vcc 1
Vss 8
NC = 13
NC = 16


Vcc
P
R
IN
OUT
N
Vss


GX-F95
OPERATION KEY SW901
REMOTE CONTROL PCB CU-5214B
SYSTEM CONTROL PCB CU-5214A
REEL MOTOR
POWER SUPPLY PCB CU-5213
TAPE SELECTOR
MEMORY
AUTO SYSTEM
TIMER START
ANTI RECORD
IC1 MB8841M-373M
IC7 NJM4558D
IC1 AP-400A
IC2 TC4011BP
HOUSING PCB CU-1026
DOOR SWITCH PCB CU-3228
DETECTOR PCB UCF-1520
SW907
COUNTER PCB CU-5217
TIME/TAPE COUNTER
TUNING PCB
MOTOR PCB CU-7007
CAPSTAN MOTOR
DOOR OPEN MOTOR
VOLTAGE SELECTOR
AC INLET
PLAY
PAUSE
BRAKE
VOLTAGE MEASURED WITH NORMAL TAPE IN AND DECK IN PLAY MODE
IC1 μPC741C
IC2 NJM4558D
IC3,4 VHE711
IC5 VHE711
A
B
C
D
E
F
G
H
I
J
K
1
2
3
4
5
6
7
8
001174A

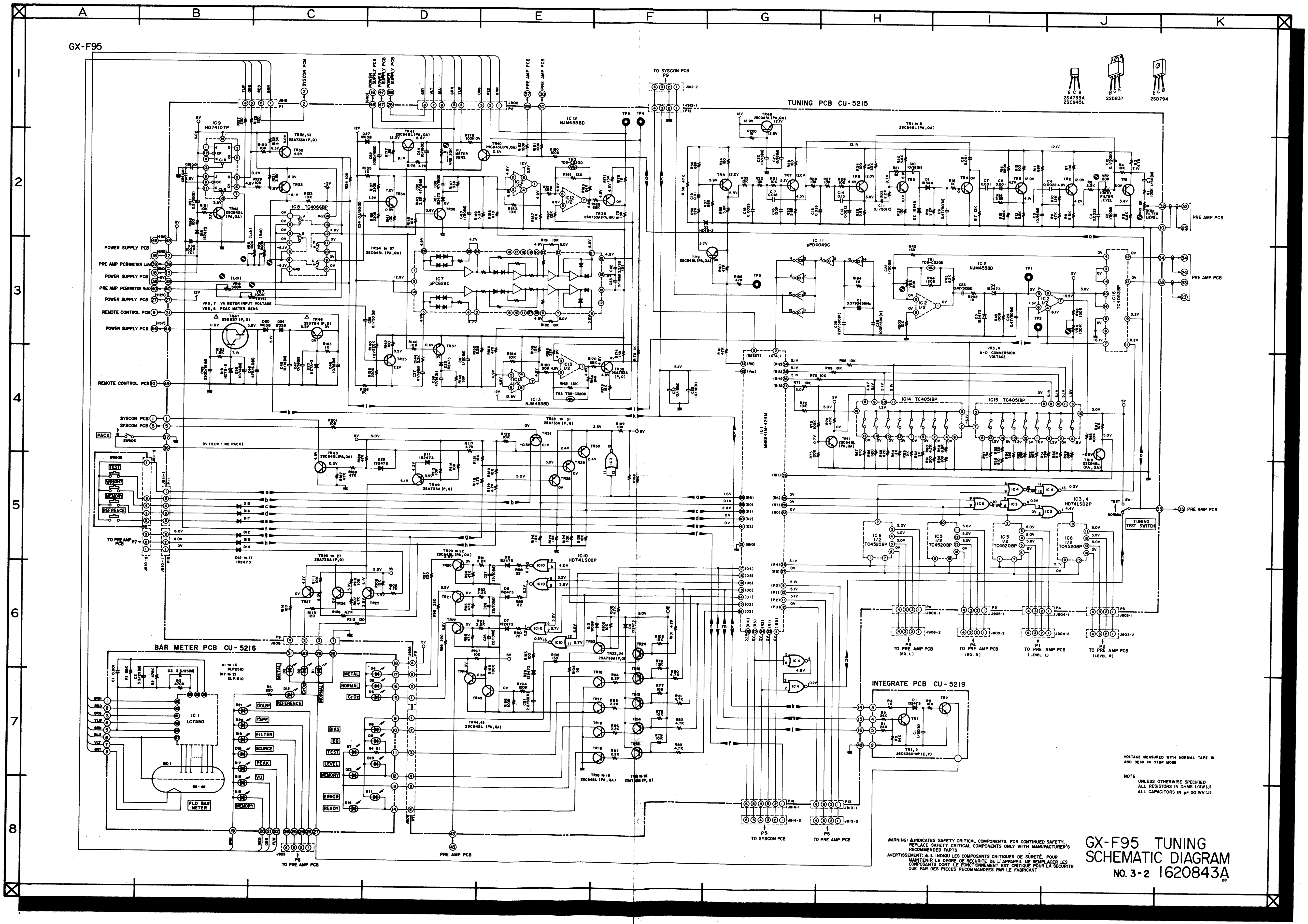
WARNING: ⚠INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS

AVERTISSEMENT: ⚠IL INDIQU LES COMPOSANTS CRITIQUES DE SÛRETÉ. POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACER LES CONPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT

NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN OHMS 1/4W(J)
ALL CAPACITORS IN μF 50 WV(J)
(FS) = FAIL SAFE RESISTORS
POWER TRANSFORMER IS DIFFERENT
ACCORDING TO AREA

GX-F95
POWER & SYSCON SCHEMATIC DIAGRAM

NO.3-1 1620842A 2C


GX-F95
TUNING PCB CU-5215
BAR METER PCB CU-5216
INTEGRATE PCB CU-5219
TO SYSCON PCB
TO PRE AMP PCB
POWER SUPPLY PCB
PRE AMP PCB
REMOTE CONTROL PCB
SYSCON PCB
IC9 HD74107P
IC8 TC4066BP
IC7 μPC629C
IC12 NJM4558D
IC13 NJM4558D
IC11 μPD4049C
IC2 NJM4558D
IC16 TC4053BP
IC14 TC4051BP
IC15 TC4051BP
IC3,4 HD74LS02P
IC10 HD74LS02P
IC1 MB8841G-424M
IC1 LC7550
VR3,4 A-D CONVERSION VOLTAGE
VR5,7 VU METER INPUT VOLTAGE
VR6,8 PEAK METER SENS.
TUNING TEST SWITCH
TEST
NORMAL
PACK
REFERENCE
MEMORY
METAL
NORMAL
CrO2
DOLBY
TAPE
FILTER
SOURCE
PEAK
VU
BIAS
EQ
LEVEL
ERROR
READY
FLD BAR METER
2SA733A 2SC945L
2SD837
2SD794
TP1
TP2
TP3
TP4
TP5

VOLTAGE MEASURED WITH NORMAL TAPE IN
AND DECK IN STOP MODE

NOTE
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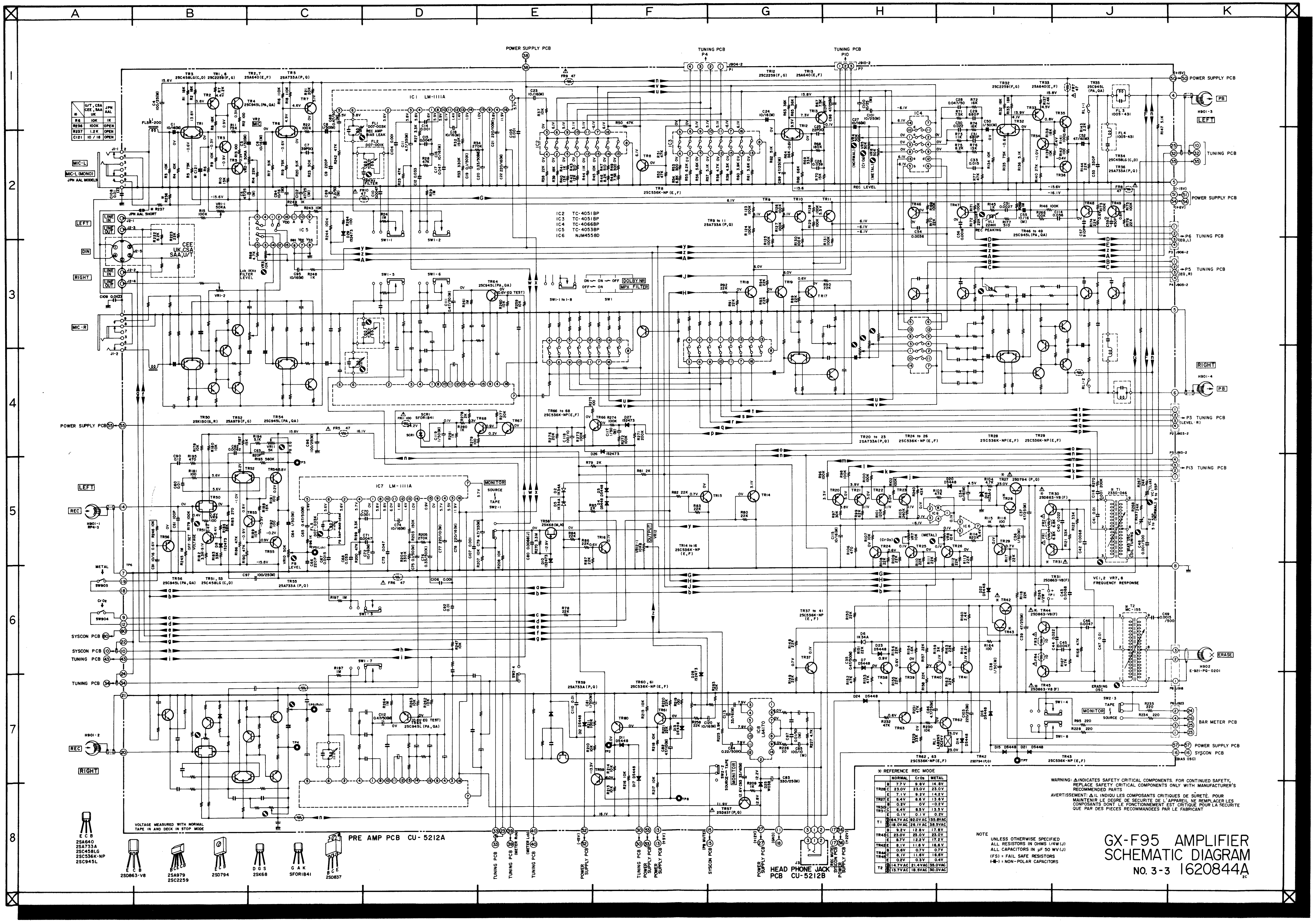
WARNING: △INDICATES SAFETY CRITICAL COMPONENTS. FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS

AVERTISSEMENT: △IL INDIQU LES COMPOSANTS CRITIQUES DE SÛRETÉ. POUR MAINTENIR LE DEGRE DE SECURITE DE L'APPAREIL NE REMPLACER LES CONPOSANTS DONT LE FONCTIONNEMENT EST CRITIQUE POUR LA SECURITE QUE PAR DES PIECES RECOMMANDEES PAR LE FABRICANT

GX-F95 TUNING SCHEMATIC DIAGRAM

NO. 3-2 1620843A
2C


POWER SUPPLY PCB
TUNING PCB
IC1 LM-1111A
IC7 LM-1111A
IC2 TC-4051BP
IC3 TC-4051BP
IC4 TC-4066BP
IC5 TC-4053BP
IC6 NJM4558D
MIC-L
MIC-L (MONO) JPN AAL MODEL
MIC-R
LEFT
RIGHT
LINE IN
LINE OUT
DIN
CEE UK,CSA SAA,U/T
PB
ERASE
REC
METAL
CrO2
SYSCON PCB
BAR METER PCB
MONITOR
SOURCE
TAPE
DOLBY NR
MPX FILTER
E C B
2SA640
2SA733A
2SC458LG
2SC536K-NP
2SC945L
2SD863-V8
2SA979
2SC2259
2SD794
D G S
2SK68
G A K
SFOR1B41
B C E
2SD837
HEAD PHONE JACK PCB CU-5212B

VOLTAGE MEASURED WITH NORMAL TAPE IN AND DECK IN STOP MODE

PRE AMP PCB CU-5212A

※ REFERENCE REC MODE

		NORMAL	CrO2	METAL
TR28	B	7.7V	9.8V	14.8V
	C	23.0V	23.0V	23.0V
	E	7.1V	9.2V	14.2V
TR27	E	6.4V	8.6V	13.6V
TR30 TR31	B	0.2V	0V	-0.2V
	C	6.4V	8.5V	13.5V
	E	0.1V	0.1V	0.2V
T1	⑨	64.7V AC	92.0V AC	135.8VAC
	[illegible]	18.0VAC	26.1V AC	38.5VAC
TR43	B	9.2V	12.8V	17.8V
	C	23.0V	23.0V	23.0V
	E	8.7V	12.2V	17.2V
TR42	E	8.1V	11.6V	16.6V
TR44 TR45	B	0.6V	0.7V	0.7V
	C	8.1V	11.6V	16.6V
	E	0.2V	0.3V	0.4V
T2	[illegible]	14.7VAC	21.4VAC	35.0VAC
	[illegible]	13.7VAC	18.5VAC	30.0VAC

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NOTE

UNLESS OTHERWISE SPECIFIED
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(FS) = FAIL SAFE RESISTORS
(⊣⊢) = NON-POLAR CAPACITORS

GX-F95 AMPLIFIER SCHEMATIC DIAGRAM

NO. 3-3 1620844A
2C